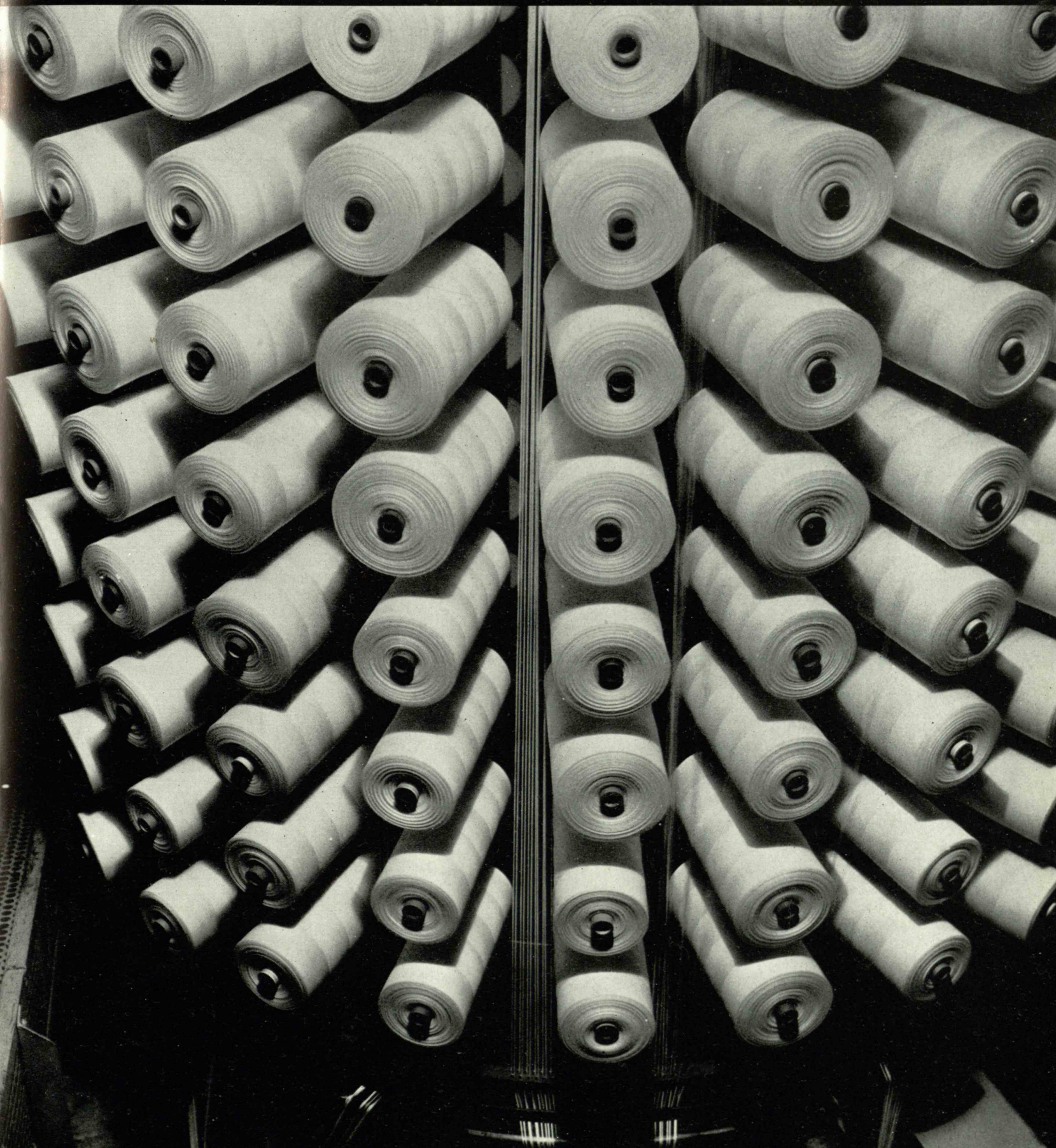


June 1938

TECHNOLOGY REVIEW

Title Reg. in U. S. Pat. Office



technology review

Published by MIT

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They Satisfy

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THE TABULAR VIEW

BECAUSE of the close partnership that has grown up in recent years between the physicist and the physician, The Review has devoted an increasing amount of space to their joint activities. An example is the article in this issue, "Exploring the Body with Atoms," by PHILIP M. MORSE (page 353), Professor of Physics at the Institute and a member of The Review staff. As President Compton pointed out in a recent address, the relation of physics to medicine can be traced historically through the interesting changes in the connotation of the word *physics*. The root meaning of physics is "that which pertains to nature or that which is in accordance with the laws of nature." The word was used originally to designate phenomena of the natural and material world as contrasted to things mental, moral, spiritual, or imaginary. It therefore referred to phenomena of living things, including the human body, as well as phenomena of the inanimate world. Later its meaning was narrowed, and in turn various branches of the natural sciences, such as biology, astronomy, chemistry, and geology, were excluded. It is interesting, however, to note that today in Webster's dictionary a physicist is defined not only as a specialist in natural sciences but as one versed in medical sciences. At least the philologists, then, still recognize the physicist's connection with the physician. Striking, too, is the fact that in France the physicist is called a *physicien*, which is almost exactly our own word for a medical practitioner. In Germany he is called *physiker*, and you may or may not know that a physicker as defined in the English dictionaries is "one who administers a physic." Despite these philological vagaries and the long separation of the physicist and physician, it is becoming increasingly clear, and Professor Morse shows it in his article, that the progress of modern science has again brought the two professions together. We see on every hand that the physicist, with his increasing knowledge and control of the forces of nature, is bringing these materials and forces more and more to the service of the physician for the curing of sickness and the preserving of health.

READERS of The Review may recall a letter published in this column last February, requesting an article explaining the mysteries of geophysics. That letter was read by a reader of The Review in Texas who wrote air mail to the Editor asking if he might provide such an article. He received an equally prompt reply asking him to proceed. The name of this alert geophysicist is ROLAND F. BEERS, '28, and his by-line appears over the article on page 356, entitled "The Great Detective Story." He is president of the Geotechnical Corporation at Dallas, Texas, and he holds a bachelor's degree from Rensselaer and a master's degree from M.I.T. Once before he appeared in The Review, writing on the same subject and under the title "Doodle-Bugs Deposed" (May, 1931). ¶ In "This Ball of Clay—How Old?" published by (Concluded on page 342)

No. 8

Just for Fun!

A CHALLENGE

TO YOUR INGENUITY

CONSIDER the gambling device which rolls three dice simultaneously. You place your bet on any selected die number—say "2". If, in the roll, "2" turns up, you get your money back, plus one, two or three times the amount of your bet, depending on the number of times "2" appears. If "2" does not show, you lose your money.

Since there is 1 chance in 6 that "2" will turn up on any *one* die, *three* dice would appear to provide 3 chances in 6 of winning. This would leave 3 chances in 6 of losing and make the gambling odds 50/50. Actually the odds are 108/125. Can you explain?

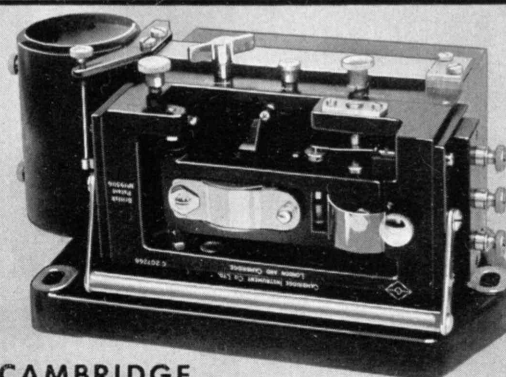
There is no gamble for *you* in our
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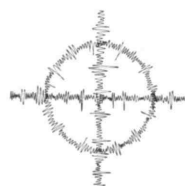
Mechanical and Electrical Engineering

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By a simple interchange of parts, this instrument may be adapted to recording of vertical or horizontal vibrations, for measuring torsional accelerations and bridge deflections.

When arranged as a portable unit, vibrations are communicated to a recording mechanism by bringing a toe into contact with the vibrating body. It employs the stylus-on-celluloid method of recording.

Send for descriptive literature

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PRESSURE WIND TUNNEL

for M.I.T. by P·DM*

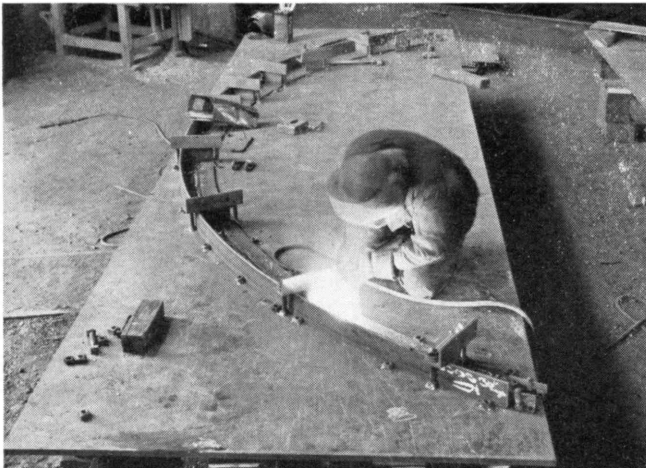


Above is shown one of the large corner girders for the new wind tunnel, lying horizontally on the steel welding floor. Welds in heavy steel assemblies cause distortions which are largely eliminated by clamping such assemblies rigidly to the heavily reinforced and anchored welding floor. This elliptical corner girder will be erected in a vertical position; the curved vanes which may be seen in the illustration serve to change the direction of the rapidly moving air in the tunnel through an angle of 90 degrees. This method of turning air has been found to be most efficient, producing less eddy and a more uniform air velocity of the tunnel cross-section than any other known method.

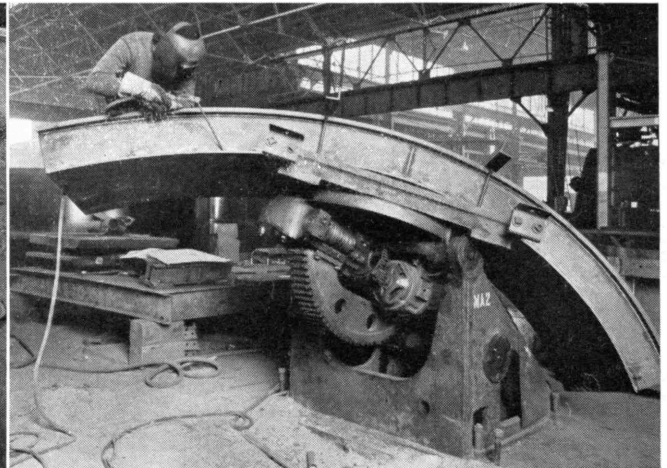
THE winds that blew at Kitty Hawk are but remotely akin to the controlled hurricanes that will dwell in the Wright Brothers Memorial Wind Tunnel.

In building this newest instrument of aeronautical research, P·DM employs the skill acquired during more than 40 years of exacting steelcraft, for science and industry the country over.

Illustrated and briefly described are a few interesting details of the work in progress . . .



A P·DM welder is here seen joining a curved angular shape and a curved flat bar together to form one of the circumferential stiffeners which will give the new wind tunnel sufficient strength to resist external pressure, when the tunnel is partially exhausted to make tests of models under rarefied atmosphere. These welders are expert in directing the flow of molten metal from the electrodes, so that the finished bead has a regular and uniform appearance resembling a jeweler's pattern.



This is a section of one of the smaller elliptical girders on the welding manipulator. The purpose of this machine is to position the fillet or joint being welded so that the welding may be done at the highest practical speed. This machine rotates through about 135 degrees on the horizontal axis and 360 degrees on the normally vertical axis, which enables any part to be positioned so that the welding may be done in the down direction. Since welding may be compared to pouring molten steel into a seam, the importance of proper positioning may readily be appreciated.

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Samuel Bloom

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1. To buy at prices which are fair to the Bell System and hence to you as a telephone user.
2. To buy at prices which are fair to the seller, so that he can continue as a dependable source of supply.

This policy is typical of those under which the Bell System operates.

Western Electric

BELL SYSTEM SERVICE

IS BASED ON

WESTERN ELECTRIC QUALITY

Alumni Day at Technology

*Commemorating on June 6 the Final Departure of the Institute
from the Rogers Building*

THE PROGRAM

June 6, 1938

Morning

8:30 A.M.—10 A.M. REGISTRATION in the main lobby of the Rogers Building, 491 Boylston Street

8:30 A.M.—12:30 P.M. RETROSPECTIVE EXHIBITION of work in the School of Architecture, Main Exhibition Room, Rogers Building

10 A.M.—12:15 P.M. SYMPOSIUM, Huntington Hall, Rogers Building

The Impact of Science on the Arts

Speakers

WILLIAM EMERSON, *Dean of the School of Architecture*, welcoming guests to Rogers and introducing:

A. LAWRENCE KOCHER, '13, *Editor, Architectural Record*, presiding

WALDEMAR B. KAEMPFFERT, *Science Editor, New York Times*

Title: "Science and Society"

JOHN MILLS, '09, *Director of Publications, Bell Telephone Laboratories, Inc.*

Title: "Engineering and Art"

MALCOLM COWLEY, *Literary Editor, New Republic*

Title: "Technology and Letters"

FREDERICK J. KIESLER, *Director of Laboratory for Design Correlation, Columbia University*

Title: "Biotechnics and Architecture"

12:15 P.M.—12:40 P.M. FAREWELL TO ROGERS, Huntington Hall. Address by Charles-Edward A. Winslow, '98

12:40 P.M.—1 P.M. Transfer of activities to M.I.T. in Cambridge. Bus service from the Rogers Building to Cambridge will be provided

The entire program of the Symposium will be heard on an international short-wave broadcast from Station W1XAL of the World Wide Broadcasting Foundation, Boston, a non-profit organization which is supported by contributions from interested friends and listeners. This broadcast will be sent out on a wavelength of 6.04 megacycles (49.6 meters).

Afternoon

1 P.M.—2 P.M. LUNCHEON in Du Pont Court, M.I.T., Cambridge

1 P.M.—5 P.M. EXHIBITIONS in the Main Lobby and adjacent areas:

- (1) The growth of an industrial design
- (2) Modern mass-produced articles

(3) Streamlining in fact and fancy

(4) Selected photographs under the auspices of The Technology Review

2 P.M.—4 P.M. JOINT CLASS DAY EXERCISES with the Class of 1938 in Lowell Court. Alumni speakers: For the Class of 1888, WILLIAM G. BESLER, *Chairman of the Board, Central Railroad of New Jersey*; for the Class of 1913, LAURENCE C. HART, *General Sales Manager, Johns-Manville Sales Corporation*

4 P.M.—4:15 P.M. Adjourn to the steps of the new Architecture Building on Massachusetts Avenue

4:15 P.M.—4:35 P.M. DEDICATION of the new home of the School of Architecture

4:45 P.M. DEDICATION of the new Davis R. Dewey Memorial Library in Room 5-330

Evening

6:30 P.M.—10:30 P.M. STEIN-ON-THE-TABLE DINNER at the Hotel Statler, Boston

Speakers

MARSHALL B. DALTON, '15, *Retiring President of the Alumni Association*

KARL T. COMPTON, *President, M.I.T.*

JOHN MULHOLLAND, *Authority on Magic*

Address and demonstration on "Science and Magic"

Program for the Ladies

IT is expected that the morning symposium, the buffet luncheon, the afternoon exhibition will all be fully as attractive to the ladies as to the gentlemen.

9 A.M.—1 P.M. Room 16 in the Rogers Building will be put at the disposal of the ladies, and for those who do not care to attend the events in Rogers, the Emma Rogers Room in Cambridge will be open from 9:30 on

3:45 P.M. Open House at the home of Mrs. Karl T. Compton

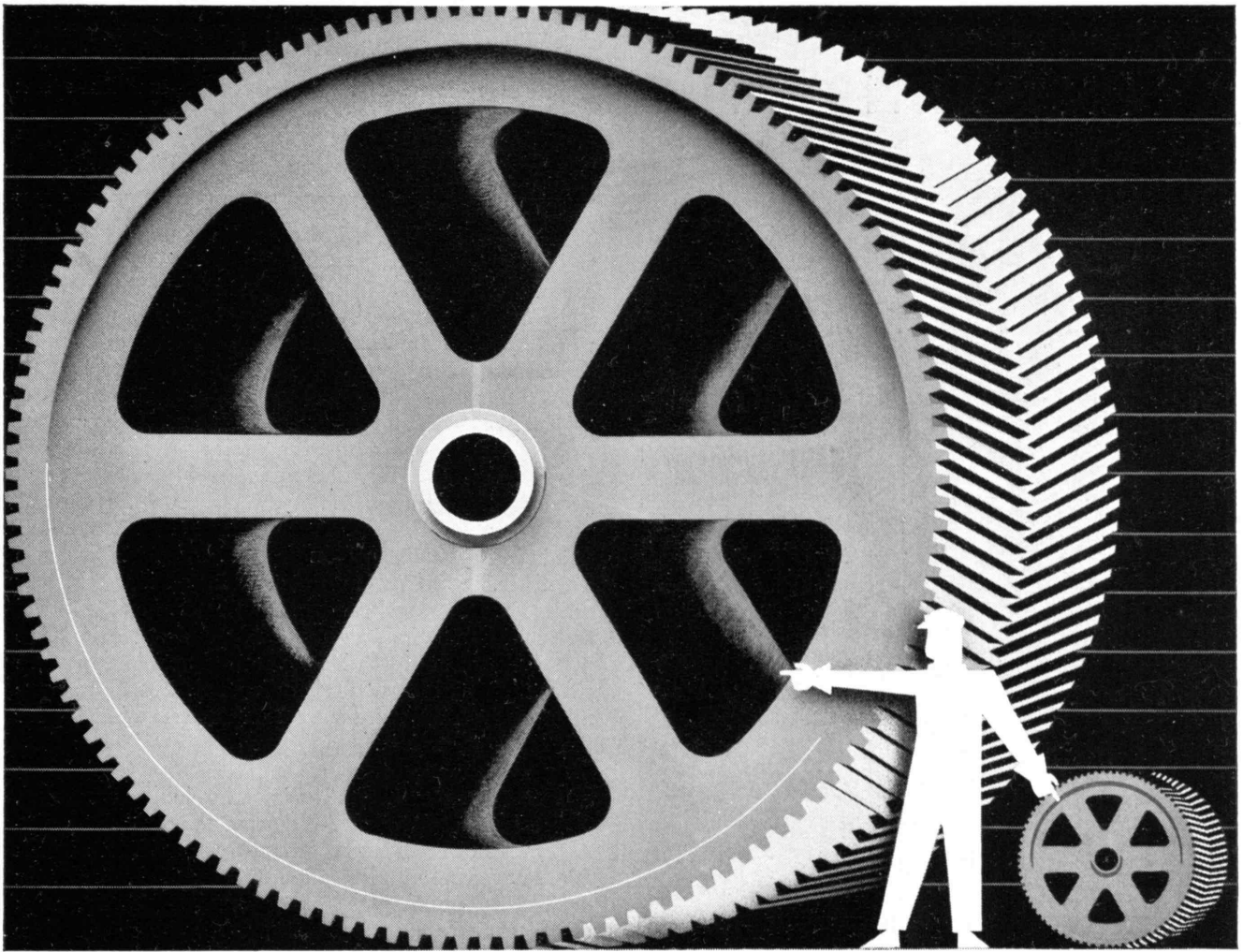
4:45 P.M. Busses leave Mrs. Compton's for a short sight-seeing trip through Cambridge on the way to The Country Club, Brookline

6 P.M. Dinner, The Country Club, Brookline

7:30 P.M. Return by bus to the Statler Hotel to participate in the evening's entertainment there

Note that the morning program is in the Rogers Building, 491 Boylston Street, Boston. Go there to register. One final word: The Banquet is not to be missed. It's to be a new departure in Technology festivals and it's included in the blanket ticket costing only \$5.00.

You are invited and urged to join other Technology Alumni in this stimulating and entertaining program "... for it's always fair weather when good fellows get together ..."



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It's a big jump from a 36-inch gear to one of 16 feet weighing 53,000 pounds. Yet their case histories show that such widely varying sizes can be handled with one steel. In these instances a Manganese-Molybdenum (0.15 to 0.20% Mo) steel was used.

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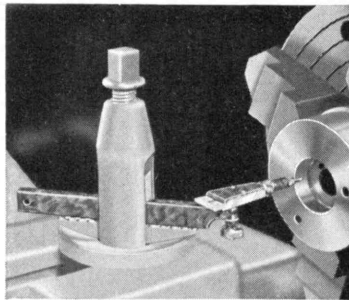
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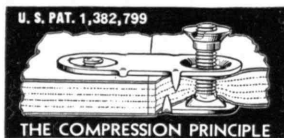
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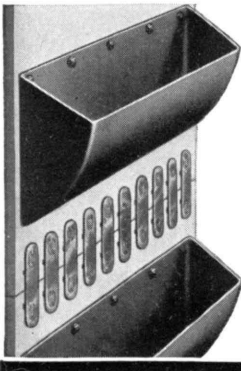
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THE TABULAR VIEW

(Concluded from page 337)

The Review last April, Professor Morse described how the "pure" geophysicist is exploring the interior of the earth. Mr. Beers's article is a sequel that describes the work of the "applied" geophysicist in the workaday world of oil exploration. ¶ Each year a score or more of M.I.T. juniors and seniors compete for the Stratton Prizes, monetary awards given for excellence in the oral presentation of scientific papers, and this year the Editor, much to his surprise, derived a great deal of pleasure from judging the semifinals of this contest and he also pounced upon one of the papers as a pertinent article for The Review. This is the article, "Should I Trade in My Car?" by VERNON G. LIPPITT, '38 (page 372). Mr. Lippitt, as an outstanding senior, this year received a Rogers scholarship and he now has the added distinction of being, with possibly one exception, the first undergraduate to have a formal article appear in this stately and learned family journal. Mr. Lippitt, we might add, placed third out of six in the final judging for the Stratton Prizes.

FROM a reader of The Review who shall go unnamed, we have received the following letter: "After several weeks of cautious investigating in a field to which I had never before given the least attention, I recently decided to purchase a \$225 phonograph-radio, with record changer and all the trimmings, for the purpose of enjoying classical piano music at home. Just as I was ready to write the check and turn in the order . . . I happened to read the editorial comment in the April number of The Review, page 258, to the effect that after five playings the first flower of the tone quality is gone from these recordings, after 25 the needle hiss increases in prominence, and after 100 the records are completely washed up. This had the effect of sending me into a state of complete estivation, as far as that purchase was concerned. I should be interested to learn, if you care to state, whether the several manufacturers of phonographs have contested your editorial statement; also whether the new needle suspension developed at the Cruft Laboratory and mentioned in the same editorial statement is to be made available to the public within a reasonable period." ¶ We are chagrined that the article in The Review halted this gentleman in his plan to equip his home to play records. We have recently done it ourselves, despite the needle hiss and despite the obvious wearing of the records. These we are willing to bear because we want music when we want it, but at the same time we anxiously await better phonographic equipment — equipment that is kind to tender records and that is not designed mainly for people with tin ears. ¶ The statements in The Review's article were correct so far as we have been able to determine and have not been challenged. Those who wish more information about the pickup developed at the Cruft Laboratory are referred to Professor F. V. Hunt of Harvard University, who will gladly supply further information.



Electricity's eyes never close . . . its service is never asleep

A BABY'S cry in the night . . . a midnight prowler . . . sickness that strikes in the dark. How grateful we may well be in emergencies for the never-failing service of electric light! Yet how few of us realize what it takes to make that service possible — what it has cost over the past 50 years in the way of investment, invention, engineering, and human toil.

Trace the wires from your light switches, and you will find them

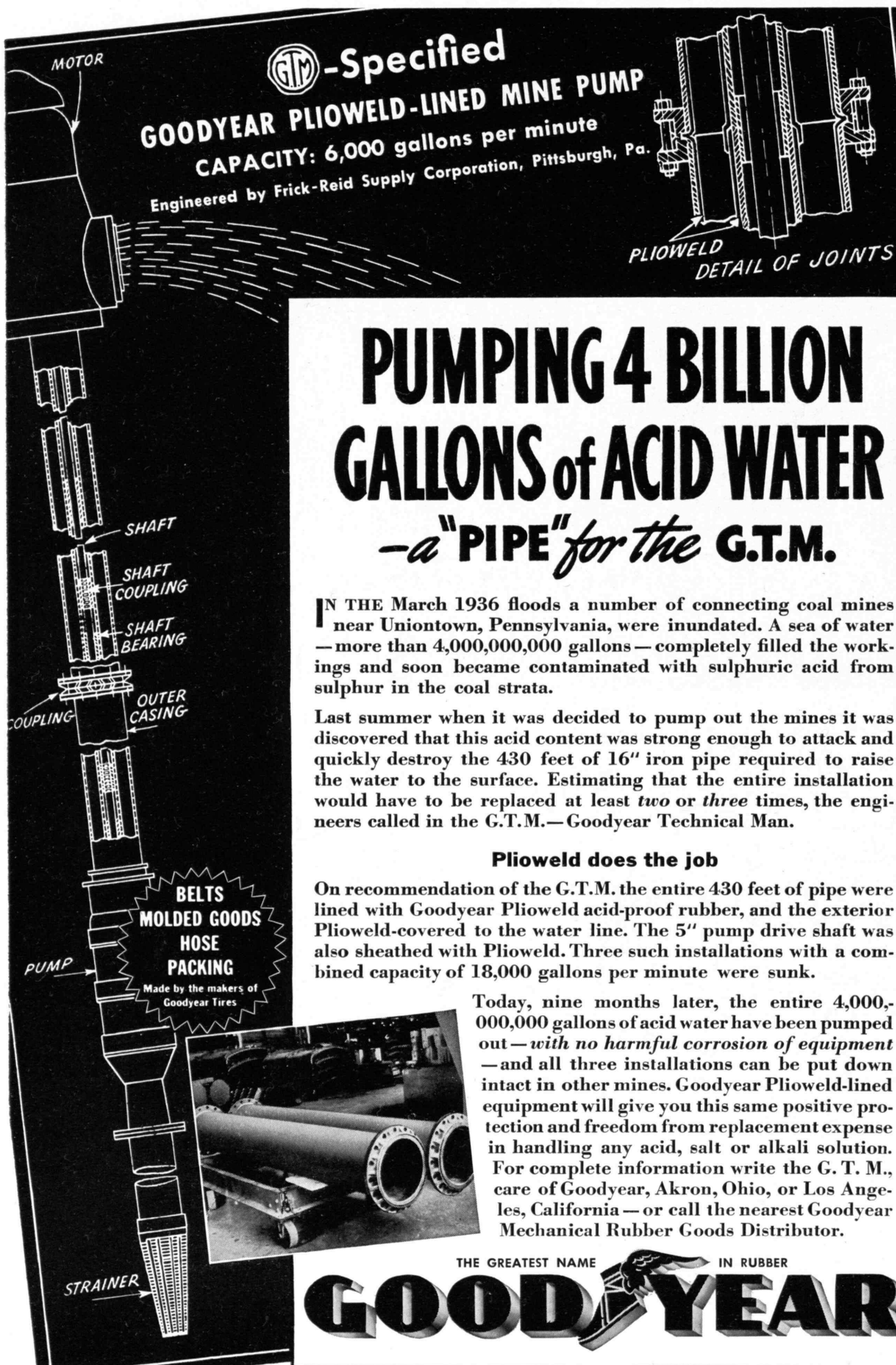
connected to an intricate system of transformers, protective devices, transmission lines, substations and generating plants that cost millions to build. To keep such systems functioning day and night, through heat and cold, storm and flood, costs millions more. Vast additional sums go yearly into research, development, and improvement. Electric service can never be called "perfect," because it is always being made better and cheaper!

Westinghouse contributions to this progress have helped to blaze the trail of electricity from its source to its infinite uses. The generating systems — the transformers and networks — the lamps that burn longer and brighter at less cost — all owe something to Westinghouse co-operation with progressive power companies. This partnership in the public interest is of direct benefit to every industry, business office, farm and home in America.

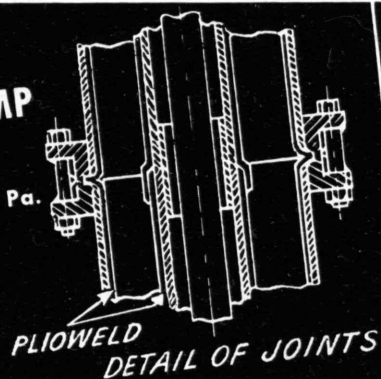


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IN THE March 1936 floods a number of connecting coal mines near Uniontown, Pennsylvania, were inundated. A sea of water—more than 4,000,000,000 gallons—completely filled the workings and soon became contaminated with sulphuric acid from sulphur in the coal strata.

Last summer when it was decided to pump out the mines it was discovered that this acid content was strong enough to attack and quickly destroy the 430 feet of 16" iron pipe required to raise the water to the surface. Estimating that the entire installation would have to be replaced at least *two* or *three* times, the engineers called in the G.T.M.—Goodyear Technical Man.

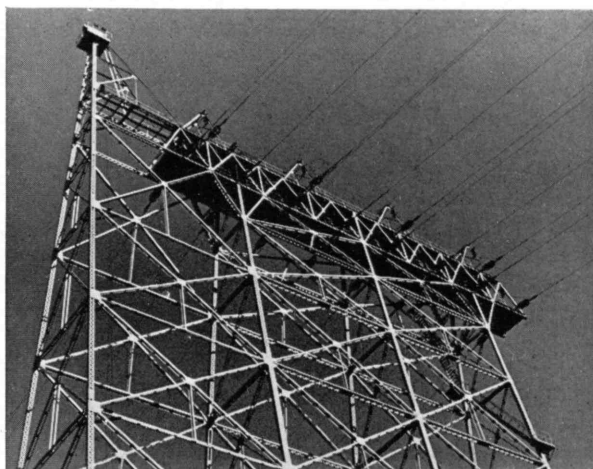
Plioweld does the job

On recommendation of the G.T.M. the entire 430 feet of pipe were lined with Goodyear Plioweld acid-proof rubber, and the exterior Plioweld-covered to the water line. The 5" pump drive shaft was also sheathed with Plioweld. Three such installations with a combined capacity of 18,000 gallons per minute were sunk.

Today, nine months later, the entire 4,000,000,000 gallons of acid water have been pumped out—with *no harmful corrosion of equipment*—and all three installations can be put down intact in other mines. Goodyear Plioweld-lined equipment will give you this same positive protection and freedom from replacement expense in handling any acid, salt or alkali solution. For complete information write the G. T. M., care of Goodyear, Akron, Ohio, or Los Angeles, California—or call the nearest Goodyear Mechanical Rubber Goods Distributor.

THE GREATEST NAME IN RUBBER

GOODYEAR



Henry D. Furniss, '37

THE TECHNOLOGY REVIEW

Title Reg. U. S. Pat. Office

EDITED AT THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

VOL. 40, NO. 8

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J. RHYNE KILLIAN, JR.

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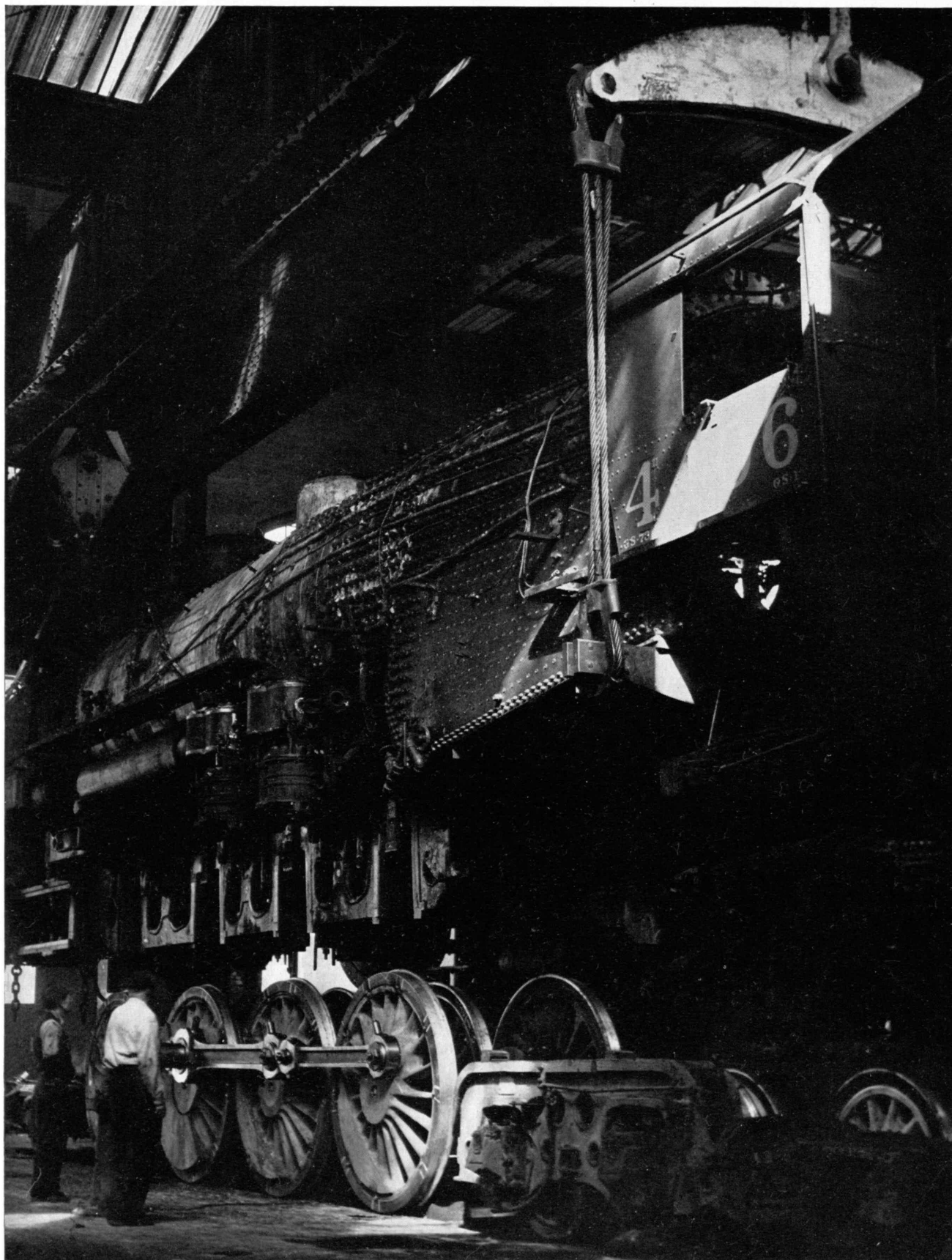
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THE RUMFORD PRESS, 10 FERRY STREET, CONCORD, N. H. EDITORIAL OFFICE, ROOM 11-203, MASSACHUSETTS INSTITUTE OF TECHNOLOGY, CAMBRIDGE A, MASS. ENTERED AS SECOND-CLASS MAIL MATTER AT THE POST OFFICE AT CONCORD, N. H. COPYRIGHT, 1938, BY THE ALUMNI ASSOCIATION OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY. THREE WEEKS MUST BE ALLOWED TO EFFECT CHANGES OF ADDRESS. BOTH OLD AND NEW ADDRESSES SHOULD BE GIVEN.



James N. Doolittle — Courtesy of Fortune

THIS BEHEMOTH OF THE RAILS SHOWS HER METTLE EVEN IN UNDRRESS

THE TECHNOLOGY REVIEW

Vol. 40, No. 8



June, 1938

The Trend of Affairs

Double-Duty Wires

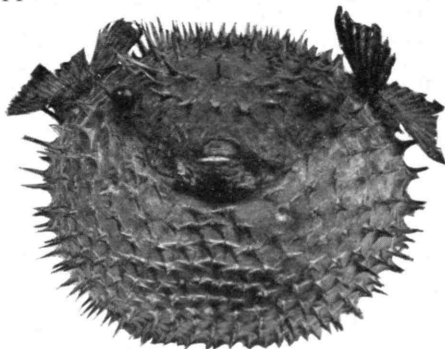
BEFORE the World War the discovery was made that radio waves, chiefly remarkable for their ability to fly through space, can with equal ease skim along wires. As a consequence a single pair of wires can carry, simultaneously, a number of separate messages. By providing a separate radio transmitter and receiver for each message and by employing the principle of tuning, as many as 20 or 30 messages can be imposed together on a single telephone circuit. At the receiving end, each receiver selects the message to which it is tuned, exactly as does an ordinary radio set.

The principle of making wires serve double duty is not confined to communications practice. Power companies for years have found possible the use of high-tension transmission lines not only for carrying power but for carrying telephone conversations and relay-control impulses as well. The utilities have applied this practice not only to the control of their own transmission systems but also of their customers' appliances. In some parts of the country where it is common practice to use electricity for hot-water heating, the consumer's heater is turned on and off from the power house by carrier impulses sent over the power lines to actuate a local relay in the heater assembly. In this manner the peak load of the system is partially under the control of the dispatcher, and the cost of the service can be proportionately reduced.

Now comes word that carrier methods can be applied in a variety of ways within the home. Time was when the electric wiring in a

house served but one purpose — to conduct power from the street circuit to lamps and appliances. But by applying the principle of carrier communication, the house owner may utilize his house wiring in ways removed from the prosaic one of carrying power. One important example is interroom communication, by which busy parents, for example, may keep tabs on the nursery. The equipment consists of two carrier-communication units, a transmitter containing a microphone and a receiver containing a loud-speaker. The microphone unit is plugged to any convenient wall socket in the nursery, while the loud-speaker unit is attached similarly in the living room, kitchen, or any other room in the house. Thereupon, any sound in the nursery is transmitted by the microphone unit, over the power lines, to the loud-speaker unit. The power lines are in no way affected by this extra duty. In some instances talk between houses is possible or between different apartments in the same building. If this is not desired, the communication may be confined by inserting small choke coils in the fuse box.

Next year's more expensive radio sets may employ carrier methods for the remote control of tuning and volume. A small tuning unit, possessing station and volume-control push buttons, is plugged in at any outlet in the house. The unit generates a radio-frequency carrier, on which the control impulses are imposed. The carrier travels over the light wires to the receiver, where it initiates the action of a small neon-filled tube. This tube, which consumes no power when the set is not in use, operates a relay through which power is applied to the receiver. Thereafter the control impulses,



PORTRAIT

... of the handsome sea hedgehog after he
has inflated himself with air

Black Star

sent over the lighting circuit by the tuning unit, are applied directly to the tuning and volume mechanisms of the set. Still another impulse turns off the radio and sets it in readiness to be turned on again at any later time.

When the system was first disclosed to members of the Institute of Radio Engineers, one member rose to say that he welcomed its advent, provided the system could be extended so that he could turn off his neighbor's set by remote control. Just such possibilities have concerned the engineers now at work on the problem, but by the latest advices they feel confident that the new receivers will preserve their individuality.

Tough Bubbles

BUBBLES are a conventional symbol of all that is transitory and fleeting, and froth of all that is without substance and consequence. "Life," wrote Chang Po-tuan in the first poem of his versified "Essay on the Understanding of the Truth," "lasts but a moment if we look at it on a larger scale of time. Life is like a bubble which is floating on the surface of water." Chang Po-tuan's essay, written in the 11th Century, is devoted to alchemy, to the art of prolonging life and procuring longevity and immortality by the use of chemically prepared medicaments. It would surely interest the ancient sage and perhaps amuse him if he could know that modern science, while still working on the age-old problem by means of hormones, vitamins, and chemotherapy and by an attack upon the chemical causes of disease and senescence (see page 350), is also interested in the longevity of soap bubbles—for these are useful tools in the researches of the engineer.

The behavior of soap films under pressure is entirely analogous to that of beams under stress, and such films used in research on machinery and structural design provide an experimental check upon the stress distribution in beams which may be calculated

culated mathematically. They also provide a means of determining the torsional rigidity and the stress of irregular sections which are not amenable to mathematical calculation. Soap films which will last in the air of the laboratory for 20 minutes or more are sufficiently long-lived for these experiments. They are not difficult to make but are short-lived in comparison with the films and bubbles which Sir James Dewar, Boys, Lawrence, Prandtl, Green, and other investigators in this country and in Europe have made in numerous studies on the nature of soap films and on the factors which influence their longevity.

The enemies of soap bubbles are evaporation, dust, oil droplets, and carbon dioxide. Dewar blew his bubbles in glass-walled boxes, closed to prevent evaporation of moisture and filled with dust-free air procured from liquid air and purified by passage through soda lime and through cotton wool dampened with glycerin. His most notable bubble was one which was 20 centimeters in diameter and lasted for 95 days. Flat films in bottles lasted much longer. Dewar used a five per cent solution of pure potassium oleate in a 50:50 mixture of glycerin and water.

Lawrence found that sodium oleate worked as well as the potassium salt and that ammonium and triethylamine oleates were even better. All investigators have agreed that the oleates are better than stearates, and of ordinary soaps the best is authentic Castile, which is made from pure olive oil. The function of the glycerin is believed to be the stabilization of the films against local discontinuities which may arise from various causes. Lawrence procured films as large as 19 centimeters in diameter which lasted in closed vessels for three years, and bubbles 40 centimeters in diameter which endured for 100 days. No such longevity as this can, of course, be expected of films in the open air, which are free to evaporate and are subject to damage and rupture by particles of dust.

G. A. Cook in the April number of the *Journal of Chemical Education* reports experiments on the preparation of soap bubbles for use in chemical lecture experiments, such, for example, as that in which a bubble is filled with hydrogen and floats upward, demonstrating the lightness of hydrogen, or that in which a bubble is filled with a mixture of hydrogen and oxygen and is exploded in mid-air. Such bubbles must withstand the fumes and dust of the lecture room and they ought to last long enough for all of the class to see them. Cook secured his best results with a three per cent solution of triethanolamine oleate in water to which 3/10ths of its volume of glycerin had been added—bubbles which lasted for more than 17 minutes and films which lasted for more than three hours. This is indeed long life in the air of the laboratory and the storm and stress of the classroom, and is not to be compared with the longer, more placid life of the bubbles of Dewar and of Lawrence, which lived out their sequestered, monastic existence in the purified dead air of closed glass boxes.

Even makers of bubble blowers for children now supply soap which yields more enduring bubbles than household soap. Bubble technology marches on.



James N. Doolittle

Woolworthian Luxury

MUCH of Bulgaria's income is derived from growing flowers from which the essential oils are extracted to be blended later into perfumes. The essential oils were once almost precious substances and are still expensive because flowers and fruits usually contain them only in minute quantities, making extraction a difficult, tedious process. A ton of geranium leaves, for instance, will produce less than two pounds of geranium oil; a ton of rose petals — 3,000,000 flowers — will yield only about one-half a pound of attar of roses. Rose oil, therefore, is worth from \$125 to \$175 a pound; but in spite of the rapidly growing use of perfumes for personal and manufacturing applications, the Bulgarian government has issued, over the past few years, a whole series of edicts designed to decrease the acreage devoted to growing roses, to eliminate entirely the growing of white roses — which give only half as much oil as the red variety — and to encourage the raising of chrysanthemums for the extraction of insecticides. The authorities at Sofia believe that the former market for their rose oil will never be fully regained; they are probably right. Natural attar of roses costs more than \$125 a pound, as previously mentioned; its synthetic twin costs \$22.50 a pound.

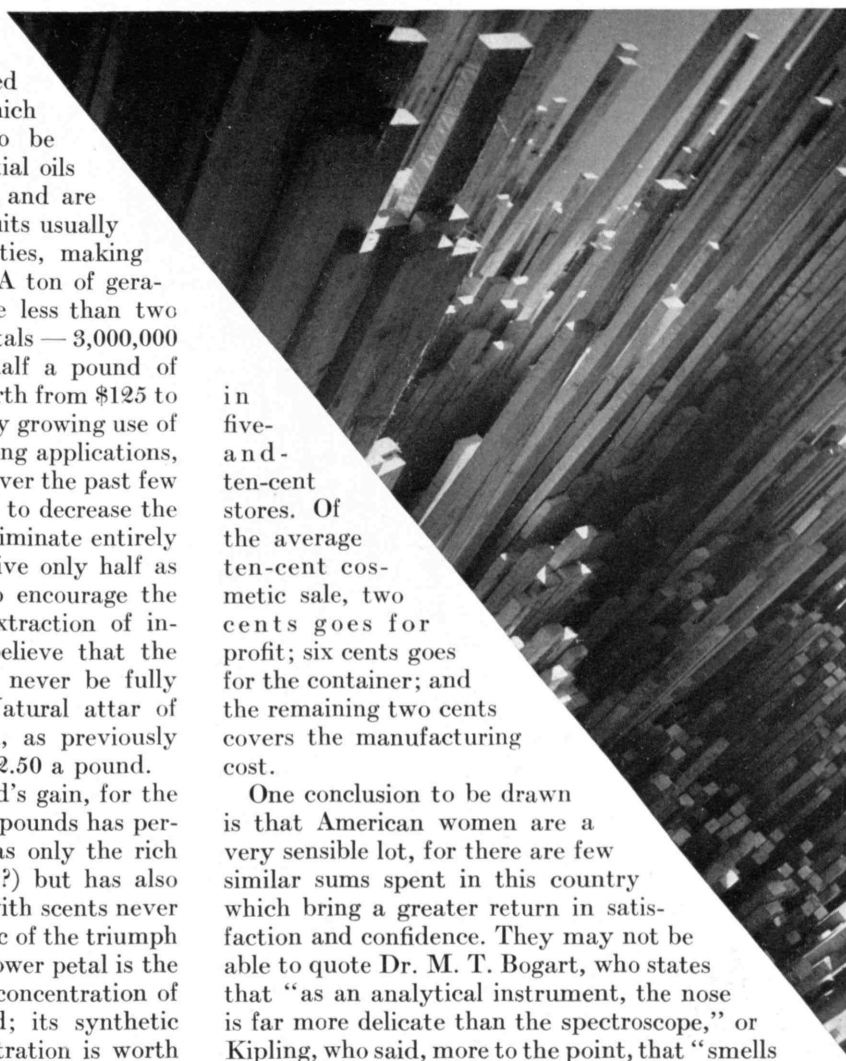
Bulgaria's loss, however, is the world's gain, for the synthesis of innumerable aromatic compounds has permitted the masses not only to smell as only the rich once could (a step toward democracy?) but has also permitted them to anoint themselves with scents never before known to man or beast. Symbolic of the triumph of the fractionating column over the flower petal is the price of violet oil. Once a 10 per cent concentration of uncertain quality cost \$400 a pound; its synthetic counterpart in a 100 per cent concentration is worth about \$4.00 a pound. Inferior in quality, tremendously higher in price, the natural essence has suffered the fate of most products thus outmatched — total eclipse. For some flower odors, such as lilac and lily of the valley, no price comparison is possible, for the natural essences were never successfully extracted. But the greatest contribution of the chemist toward good and cheap perfume is probably the synthesis of certain large-ring carbon compounds which have the characteristics of musk and civet essences, the glandular secretions whose fixative and blending powers make possible superior perfumes. Were pure musk essence ever to reach the market — which it never has — it would be worth, probably, about \$40,000 a pound. Sixteen carbon atoms can be joined by Du Pont chemists into a molecule which does everything that natural musk does but costs about \$250 a pound. Nevertheless, in spite of radical alteration of price and volume factors, more essential oils still come from natural than from synthetic sources.

So far, the most apparent result of all these oxidations, esterifications, condensations, evaporations, crystallizations, and much smelling in between, has been the yearly exchange by American women of \$200,000,000 for many more million pretty containers. About 90 per cent of the perfume disposed of in this country, accounting for some 15 per cent of the value of such substances, is sold

in five- and ten-cent stores. Of the average ten-cent cosmetic sale, two cents goes for profit; six cents goes for the container; and the remaining two cents covers the manufacturing cost.

One conclusion to be drawn is that American women are a very sensible lot, for there are few similar sums spent in this country which bring a greater return in satisfaction and confidence. They may not be able to quote Dr. M. T. Bogart, who states that "as an analytical instrument, the nose is far more delicate than the spectroscope," or Kipling, who said, more to the point, that "smells are surer than sights or sounds to make the heart strings crack." But they know that scents can carry tremendous emotional stimulus, the more potently because they generally work subconsciously. Western menfolk have always vehemently denied any weakness toward mere smells, but shrewder individuals have for long realized that, properly utilized, aromas could be made into highly effective sales tools. As soon as the Crusaders reintroduced a few civilized touches into Europe, among them perfumes, the master glove-makers of France began to use them on their products and thus became the first in a notable line of perfumers. Today mostly women's gloves are perfumed. Perfumes were being used in soaps quite widely by the time of the Second Empire in France, but aromas came from relatively cheap products — lemon oil, lavender, sandalwood, and honey. Even such soaps were far beyond the reach of the masses. The synthetics, however, have given the soap manufacturer a wide range of odors which will not produce discoloration, will not boil off under the high temperatures of manufacture, and are cheap enough to be included even in laundry soaps.

A huge outlet for sweet smells is the cigarette industry. Although frankly perfumed cigarettes have only a small market, every widely used cigarette is flavored, that is, contains some spice, extract, essential oil, or





James N. Doolittle

HOLLYWOOD CURVES

Water-supply dam for the Cinema City

sugar that will modify the taste and odor of the tobacco. In 1929, for instance, a favorite was coumarin; one manufacturer found that maple sugar gave somewhat the same smell and used 4,000,000 pounds of it in a year.

A breath of luxury is now being given to articles far less intimate than cigarettes. Many fly sprays, for instance, now contain up to six per cent of perfume, and, where means allow, appropriate variations on the idea may be made. One millionaire gave a barn dance at the height of the New Jersey mosquito season, but decided to have the party exclusive without the need for gas masks. A chemist was called in, a scent of new-mown hay added to the spray, and the mosquitoes died a sweet death. The textile industry, however, offers a more imposing opportunity to the perfumer—if that is the correct term. Many processes and dyes used in the finishing of fabrics leave residual odors. As an example, silk is sometimes immersed in a vegetable-oil bath which leaves small traces behind that later turn

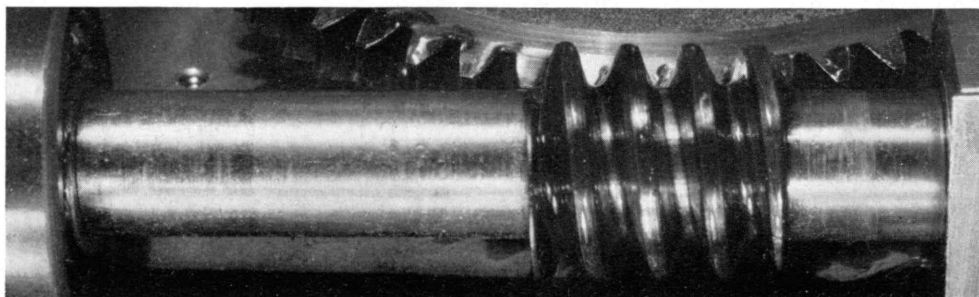
rancid. But one manufacturer who developed a deodorizing substance a few years ago found no takers among finishers or dyers because they were not receiving any complaints. The stores, however, were more acutely aware of consumer preferences, and an appeal to them was successful in developing a demand for the product. More recently, dyers of crush-resistant velvets have turned to perfumes to mask undesirable dye odors.

The Diseases of Civilized Man

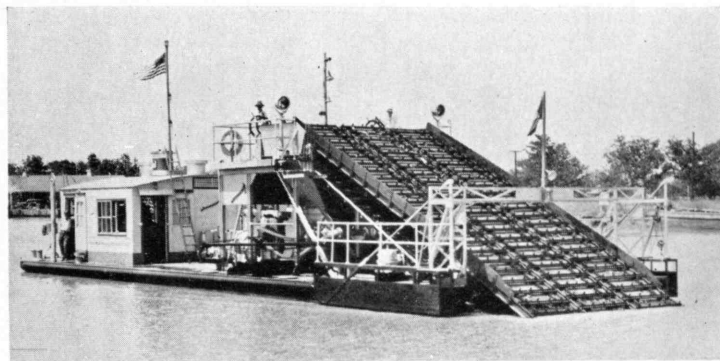
BBETTER adjustment of man's body to the demands of an increasingly complex environment is a problem made more difficult by the lag between the rate at which environment changes and the infinitely slower rate of natural accommodation. The position of cardiovascular diseases as most potent cause of death among modern civilized men illustrates the case clearly, if one recognize that the stress and strain consequent upon the constant high nervous tension of modern civilization contribute directly to the production of these ailments. The greater prevalence of heart disease, hardening of the arteries, peptic ulcer, and other digestive disorders among professional men has led in the past to the theory that some such connection existed between the "diseases of civilized man" and the demands which his environment and activities put upon his nervous system.

The first definite experimental support for the theory is contained in experiments described recently at the annual meeting of the American College of Physicians by Professor George Edward Hall of the department of medical research, University of Toronto. The culpable agent in question is the chemical acetylcholine, which acts as a vehicle or catalyst in the transmission of nerve impulses, being secreted by the parasympathetic nervous system, one of the two divisions of the autonomic nervous system which controls the so-called involuntary activities of the body, such as breathing. The second division, the sympathetic system, liberates, in postganglionic nerve fibers, a second powerful drug, adrenin, which resembles the heart stimulant, adrenalin, produced by the adrenal glands. A delicate balance between the two chemicals is maintained in a normally functioning nervous system, according to Professor Hall's evidence.

Upsetting this balance by means of daily doses of acetylcholine to experimental animals, Professor Hall found that diseases of the heart and stomach closely resembling the diseases of civilized man occurred in the subjects. If the delicate adjustment of the human nervous system can be similarly upset, not by deliberate dosage with acetylcholine but by excessive secretion of it because of the strain of civilized life, a theory is suggested for the origin of the degenerative diseases. There is possibility of a means of treatment for these ills, for already Professor Hall's experiments have shown that



General Radio Company



Westinghouse Electric and Manufacturing Company

HYACINTHS DREDGE

This odd-looking craft scoops up the dense growths of water hyacinths that infest the bayous of the lower Mississippi, impeding navigation.

the drug atropine inhibits the action of overdoses of acetylcholine in test animals.

The reverse of the acetylcholine medal appears in a recent communication to *Science* describing the use of guanidine hydrochloride, a synthetic preparation, in cases of myasthenia gravis — an excessive fatiguability of the muscles which leads eventually to paralysis. A. S. Minot, Katharine Dodd, and Samuel S. Riven of the Vanderbilt University Hospital report that decreased sensitivity to the action of acetylcholine is probable in myasthenic muscles. Guanidine temporarily restores a more normal sensitivity, permitting the muscles to function better in response to nerve impulses.

The Tottering Pillars of Hercules

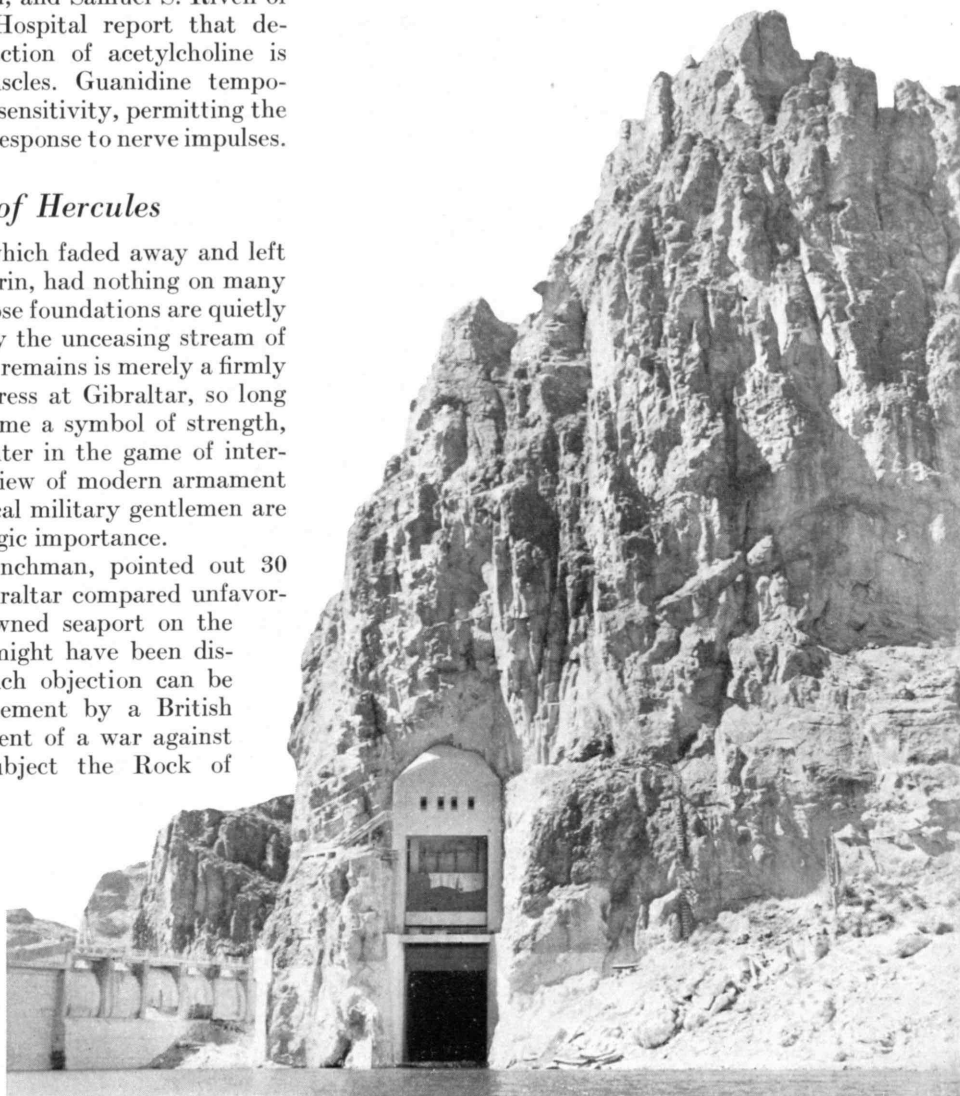
CARROLL'S cat, the one which faded away and left Alice staring at only a grin, had nothing on many a firmly established truth whose foundations are quietly and unsuspectingly eroded by the unceasing stream of technical advance, until what remains is merely a firmly established illusion. The fortress at Gibraltar, so long impregnable that it has become a symbol of strength, may still be a powerful counter in the game of international diplomacy, but in view of modern armament developments, certain skeptical military gentlemen are already questioning its strategic importance.

When René Pinon, a Frenchman, pointed out 30 years ago that as a base Gibraltar compared unfavorably with Bizerte, French-owned seaport on the African Coast, the analysis might have been dismissed as prejudiced. No such objection can be raised against a recent statement by a British vice-admiral that "in the event of a war against Spain, siege guns could subject the Rock of

Gibraltar to a continuous bombardment and airplanes could bombard it from Algeria and Morocco. The rock is untenable in a war against Spain [contrast this bald statement with recent utterances by the British Foreign Office that an insurgent victory in Spain would not necessarily be against the best interests of Great Britain] and would be exceedingly unpleasant to live on in the event of a war with France." He suggests that, as soon as Spain settles down again, Great Britain offer to exchange Gibraltar for Ceuta, on the opposite shore.

As background to the admiral's words, it might be remembered that the last siege to which the famous fortress was subjected occurred in 1779 to 1783 and that drinking water is obtained mainly from rainfall, although storage tanks can hold some 6,000,000 gallons in reserve.

More recently, Lieutenant Commander Charles Moran, United States Naval Reserve, has pointed out that because of the increased radius of action of modern fighting ships, "positions 'commanding' the straits are as numerous as the 'keys' to the Caribbean or the 'strategic outposts' on the Pacific." In view of the



United States Bureau of Reclamation

THE SPECTACULAR
... setting of the Horse
Mesa Spillway, Salt River
Project, Arizona



IN DRY DOCK

The screw of the Alabaman of the American-Hawaiian Steamship Company

tremendous amounts of complicated equipment and elaborately processed materials required by modern sea and air fleets, a good base should be backed by a large area which is friendly, thus protecting its rear, and should be heavily industrialized, thus enabling the base to support the fleet instead of the reverse. Gibraltar apparently lacks these assets.

Among points which Moran feels could be made into bases rivaling Gibraltar in effectiveness are Tarifa — an old Moorish town whose onetime success in dominating the straits is attested to by the word “tariff” — Cádiz, Oran, and Melilla. “The Pillars of Hercules,” he exclaims, “are becoming a colonnade!”

Strange—Hidden

FORTY years ago their discovery was noted in the scientific world; ten years ago they were still too rare to be laboratory curiosities; in ten months, perhaps, they may be sold, like the perfumes described on page 349, over the counters of five-and-ten-cent stores. This is just another example of what happens when engineers give the public what it wants, even if the public has to be told what it's asking for.

With the ardent unanimity that politicians dream about but never witness, householders desire to reduce their electric bills, the important factor in which is current consumed by incandescent lamps. The cost of operating these lamps, large as it now is, would be far greater had Langmuir not conceived the gaseous atmosphere 25 years ago. This cost may soon become substantially smaller because a number of French scientists and technicians have succeeded in isolating in com-

mercial quantities the gases which best meet the conditions for such an atmosphere: no chemical action on the filament; minimum heat conductivity; high resistance to the diffusion of tungsten vapor. Argon and nitrogen are good; krypton and xenon are much better. The term krypton, however, means hidden; xenon, strange — designations well deserved in light of Lepape's determinations that the air contains one part in 1,000,000 of krypton and one part in 20,000,000 of xenon, these ratios, by the way, being respectively 20 times and 15 times larger than had been supposed.

Lepape also discovered that these gases were naturally concentrated in the liquid oxygen baths used in the machines that separate oxygen and nitrogen from air and, by 1923, had worked out a method of extraction that enabled him to produce enough of the gases, mixed in the proportions in which they exist in air, for the preparation of laboratory test lamps. Five years later Georges Claude (known for his invention of the neon sign, for his work on the commercial liquefaction of gases, and for his economically futile attempt to generate power from the temperature difference existing between the top and bottom layers of the tropical seas) evolved a process for the continuous production of several dozen liters of the two gases daily. Development work by L'Air Liquide Société has continued, and today at least two plants whose principal products are these rare noble gases are operating in Europe.

Krypton-xenon filled lamps are already being sold in France. Compared with the argon-filled type which converts 10 per cent of the energy entering it into visible light, the new lamps can produce 13 per cent of “seeable” rays. Considering a 1,000 lumen unit (about 64 watts), their operating cost is about 16 per cent less than that of a standard gas-filled lamp, but their cost is considerably higher. A 64-watt krypton-xenon lamp sells for 13.65 francs, 5.90 francs more than a 60-watt argon lamp, which, however, yields only 75 per cent as much light.



Garrison

WILLIAMSBURG (VA.) INN

Awarded first prize at the annual exhibition of the Boston Society of Architects and the Silver Medal as a “work of major importance” at the 1938 exhibition of the Architectural League of New York. Designed by Perry ['07], Shaw and Hepburn ['03], who supervised the reconstruction of Williamsburg

Exploring the Body with Atoms

Examining Living Organisms without Taking Them Apart

BY PHILIP M. MORSE

IT seems a far cry from the study of neutrons, electron multipliers, and superhigh-voltage generators to the study of living organisms; nevertheless it seems probable now that some of the most exciting and important applications of recent advances in physics will be in biology. In this latter field the physical methods will be used as tools, and the results will be obtained by biologists and medical men, working in close coöperation with the physicists. Coöperation among experts in separated fields seems to be a growing fashion these days, one of the most promising aspects of modern science.

The study of the mechanism of life has its own peculiar difficulties and hindrances, many of which are present only in a minor degree in the study of nonliving matter. Some of these difficulties spring from the facts that the important property of living matter is its coöperative organization and that most attempts to study the organism destroy the organization, leaving the student with dead parts on his hands. One would have difficulty in understanding the mechanism of a watch if its parts cascaded into one's lap every time the case was opened.

Physics has had a somewhat similar problem in the study of the atom. The research worker's fingers always seem to be monkey wrenches when he probes the atom; and the effect of such crude tools on delicate machinery is proverbial. After many attempts to get rid of the monkey wrenches and still make the measurements, the physicist has become reconciled to the presence of the monkey wrenches and he approaches the problem by more indirect methods. He has incorporated the "monkey-wrench effect" into his theory — as the uncertainty principle which has roused so much misplaced excitement among the philosophers. And he has also refined his equipment, in order to make the monkey wrenches as small as possible.

Similar efforts are needed in biology to circumvent the damage an experiment produces on the organism studied. Biology is too little developed as yet to have much underlying theory, but the monkey-wrench effect will probably play an important role in the theory as it is developed. Meanwhile biologists are striving to refine their tools, in order to study organisms by methods having the least possible damaging effect. In this struggle the new techniques developed in physics are proving decided aids.

For instance, new electrical devices, in particular the various types of vacuum tubes, make it possible to measure exceedingly small currents and voltages. Since every biological change involves minute electrical

THE PHYSICIST GOES TO THE AID OF THE PHYSICIAN — THE MONKEY-WRENCH EFFECT — HOW THE DISCOVERY OF RADIOACTIVE ISOTOPES MAKES IT POSSIBLE TO FOLLOW LIFE'S CHEMISTRY, ATOM BY ATOM

changes, it is found that electrical measurements, which involve little damage, can be used to indicate and to measure indirectly the underlying biological processes. The study of the electrical waves accompanying heart action has progressed far enough so that the electrocardiogram is useful in diagnosis. Other similar studies are being made, but only a few have

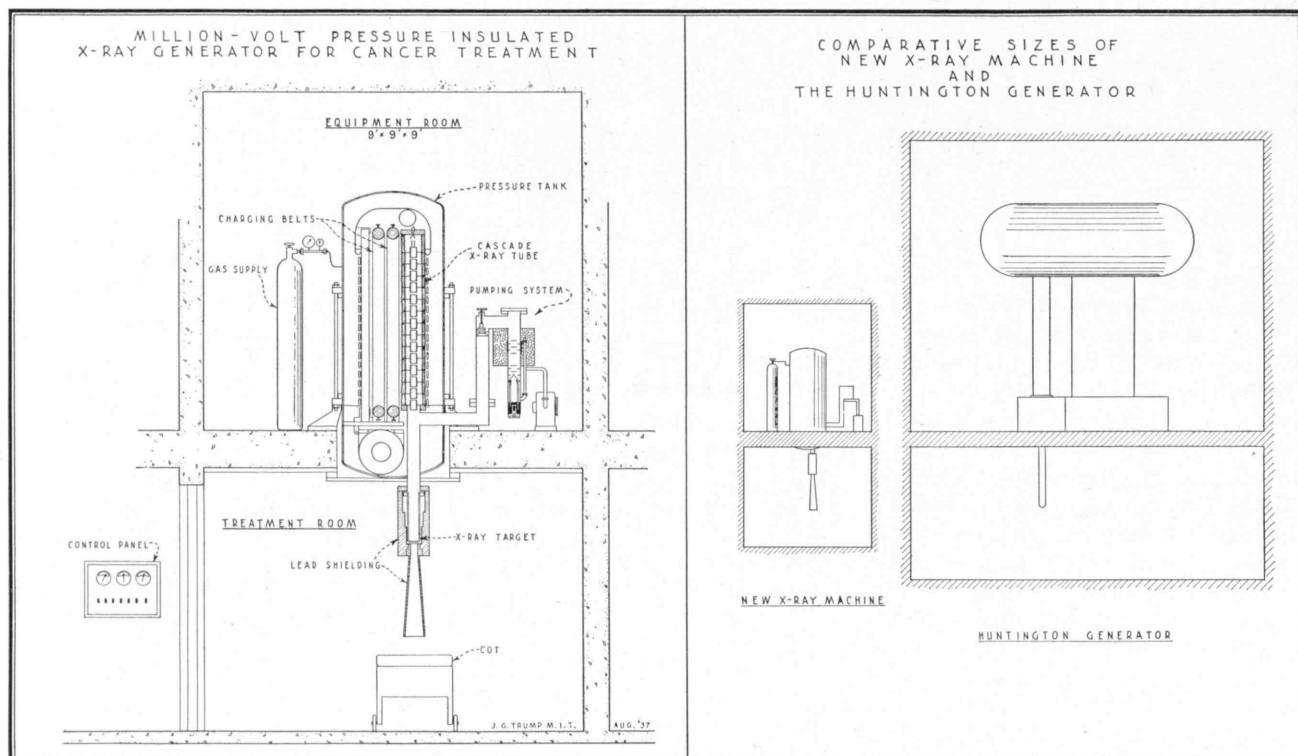
acquired the mass of correlated data necessary before any device can be used as a biological indicator.

Exceedingly interesting studies are being made of the mechanism of nerve conduction, the central problem in the study of the organization of life in the higher animals. Electrical impulses accompany nerve signals, and a study of these pulses, which are sometimes spasmodic, sometimes almost periodic, is proving of considerable value in the understanding of the abilities and limitations of our internal telegraph system. The much publicized encephalograms, the so-called brain waves, are probably related to the nervous turmoil in the brain which we call thought; but the phenomenon is so complex that a great deal of work is necessary before the



NEW TOOL FOR PHYSICIANS

To facilitate observations of heart rate, the new research laboratories of biological engineering at M.I.T. have applied the latest developments in electronics to obtain the cardi tachometer. Connected by means of flexible electrodes, applied in this instance to the arms, the voltages accompanying muscular action of the heart are caused to operate a meter which gives a direct reading of the pulse rate and shows temporary changes in rate which cannot be observed by other means. It is particularly useful with small animals, such as laboratory mice, in which the rate is too high to be counted directly. The cardi tachometer is now being applied in operating rooms as a tool of the anesthetist



NEW STYLES IN MILLION-VOLT X-RAY GENERATORS

A new x-ray generator, to equal in voltage and output the highly successful million-volt unit completed by M.I.T. for Boston's Huntington Memorial Hospital last year, but to occupy less than one-tenth the space required by it, is now under development in the high-voltage laboratories of the Institute. The new generator will rely upon insulation by gas under pressure and consequently will not require the housing space necessary for safe operation in air at ordinary pressure. At the left is shown a sectional view of this new generator, while at the right is graphically shown the economy of space achieved since the new generator was designed

measurements will be of direct use to biology or psychology. Much of this work is being carried out at Tuxedo Park, N. Y., by Dr. Alfred L. Loomis, the banker who is also a top-flight physicist.

The same conclusions must be made about the exceedingly interesting work of Professor J. Warren Horton, '14, here at Technology, on the electrical impedance of the human body. The preliminary results seem to indicate that this impedance is an indicator of general bodily well-being; but the possibilities and limitations of the method can be determined only by an accumulation of vast amounts of data. Similarly, certain work at Yale and at the Harvard Medical School, showing that there is a measurable electrical fluctuation accompanying ovulation, gives some promise of aid in the immensely important study of human fertility. This is also receiving much more investigation.

Other physical techniques are likewise proving useful. The utility of ultraviolet light is now established, as is also the fact that there are definite limitations to its use. Ultraviolet exerts its effect only at the surface of an organism; an attempt to penetrate deeply below the surface would involve such intensities as to produce a supersunburn on the surface. X-rays, however, can penetrate much more deeply without injuring the surface, although if the intensity is too great, the injury is more serious. One of the important medical advantages of x-rays is that the injuries are selective—cancerous growths, for instance, being slightly more susceptible than normal tissue. The difference is only

slight, however, and it often happens that in order to affect a deep-seated growth, so great an intensity would have to be used that the normal surface tissue would be harmed.

The solution of this difficulty is to use x-rays of greater penetrating power, of shorter wavelength, and requiring higher voltages. One of the pioneers in this field is the million-volt outfit at the Huntington Memorial Hospital, Boston, built by Professor John G. Trump, '33, one of Professor Van de Graaff's colleagues here at Technology, and turned over to Dr. Richard Dresser, who has supervised the medical use of the equipment. It has been in operation only a year, but the number of successful treatments already made indicates its extreme usefulness. It is possible that even higher voltages will be practical and useful. Professor Trump is at present building a much more compact x-ray outfit, using compressed gas for insulation, which should deliver somewhat more than a million volts.

The other use of x-rays, to make shadowgraphs of organisms for diagnosis and study, has long been employed and is constantly being extended. It constitutes an earlier gift from physics to medicine.

By far the most exciting possibilities for future applications to biology, however, lie in the artificially radioactive substances which are now being discovered. Corresponding to practically every chemical element, there have been found one or more radioactive isotopes of the element. Atoms of these substances are indistinguishable by chemical means from normal atoms of

the element. Their difference lies in their latent instability. Sooner or later an atom of the radioactive isotope explodes, its inner nucleus shooting off radiation similar to that from radium and changing during the process into the nucleus of a different chemical element. An atom of a radioactive isotope is thus the black sheep of the family, having outwardly the same family characteristics as his normal brothers and sisters but being likely to disappear at any moment, leaving a cloud of scandal behind. These unstable brothers are created by bombarding normal substances with high energy particles or with neutrons, which are in turn produced by high energy particles. When the large electrostatic generator at Technology is set up for the generation of artificially radioactive substances, it will be able to produce large quantities in relatively short times.

Some of these substances are extremely precocious, going amuck a few minutes after birth, not leaving time enough for their properties to be used. Many isotopes, however, last for a day or a week, and enough more kinds are being discovered each month to make it reasonable to expect that most of the important chemical elements will have at least one kind of relatively long-lived radioactive brother. If a few atoms of such a substance are placed among a large number of their normal brothers and sisters and the whole family is injected into an organism, each unstable brother will stick with the family until he blows up. The effects of the explosion can be detected by any of a variety of vacuum tube devices. These explosions tell us the location of the radioactive atoms and, what is more impor-

tant, the locations of their normal brothers and sisters. To change the metaphor, we now can tie a radioactive bell to our normal chemical cat, so that we can follow its otherwise silent motions through the organism. When we remember the immense importance small amounts of chemicals have on the organism and when we realize the difficulty of following their flow (since we cannot change their rate of flow much without killing the organism), we can see that the possible uses of the radioactive tag method in biological research are almost unlimited.

Examples of the sort of experiments which can be done will make the possibilities more clear. Phosphorus has a nice radioactive brother, fairly easily produced by the bombardment of sulphur by neutrons and having a mean life of about two weeks. Suppose we mix a minute amount of the radioactive phosphorus into some normal phosphorus, in such a proportion that one exploding nucleus a second would indicate the presence of one microgram of phosphorus (about twenty quadrillion atoms of normal phosphorus), one explosion a minute would indicate $\frac{1}{60}$ of a microgram, and so on. Now suppose we feed an animal a few grams of this "labeled" phosphorus some morning and, after waiting for a day, or a week, or whatever length of time we wish to study, take a small sample of a tooth of the animal and count the number of telltale nuclear explosions per second. This number tells us directly how many milligrams of the labeled phosphorus have traveled through the animal during the time studied and have eventually settled down on the sample tooth. (Continued on page 376)

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M.I.T. Photo

The Great Detective Story

Old Ways and New in the Discovery of Oil

BY ROLAND F. BEERS

THREE million, three hundred thousand barrels of oil! That is the daily order for the nation's supply of crude petroleum. To fill this order unfailingly means that each year more than 1,000,000,000 barrels of oil must be added to the nation's reserves. In 1937 the known and proved natural petroleum reserves in storage and in the ground were estimated to be 13,000,000,000 barrels—enough for ten years' demands. This figure represents, in a measure, the success of those who are charged with the responsibility of maintaining an unceasing flow of this important fuel.

The first well to produce petroleum in commercial quantities, drilled primarily for this purpose, was the famous Drake well at Oil Creek, Pa., which, in 1859, reached a depth of 69 feet. Its initial production was 25 barrels per day by pumping. Since that time the United States has produced and discovered approximately 30,000,000,000 barrels of petroleum, 90 per cent of this amount having been discovered within the last 35 years. With the price of oil averaging one dollar per barrel, the scope of this production places the petroleum industry among the greatest of the nation. Further idea of the capital investment of the industry may be had from the amount of crude oil in storage above ground. On April 2

ADDING A BILLION BARRELS YEARLY TO OUR OIL RESERVES — THE SLY AND INGENIOUS DETECTIVE TECHNIQUES OF THE GEOPHYSICISTS — ARE THEY ADEQUATE TO MAINTAIN OIL SUPPLIES FOR THE FUTURE?

the Bureau of Mines estimated this to be 308,237,000 barrels. On April 3, 1937, the corresponding figure was 298,163,000 barrels. In Texas, our greatest oil-producing state, average daily production has increased from 100 barrels in the year 1897 to 1,378,000 barrels per day in 1937.

In the famous East Texas field, largest in the world, the 25,000th well was completed recently.

On December 31, 1936, the total number of producing wells in the United States was estimated at 350,000, of which 25,166 were completed in 1936. The total production in the United States during 1936 was 1,098,516,000 barrels; that of the world was 1,700,271,000 barrels.

The magnitude of such figures is so far from the experience of most of us that these statements have little meaning. The scale of the entire industry is gigantic, and frequently oil talk hears that the unit of exchange is a million dollars. In spite of the overwhelming effect which such a scale of operations produces, it is possible to realize that here is one of the most orderly and scientifically planned industries of the nation. In all phases of the industry is found competent and energetic management. The ability to regulate its conduct by self-enforced measures is an index of this efficiency.

Depending for its very life upon a continuous supply of petroleum at reasonable cost, it is not surprising to find a major portion of the industry's attention centered in the production division. Few other industries are comparable in the degree and perfection of organization in the producing divisions of oil companies. In the matter of exploration alone, with which this article is primarily concerned, you will find long-term policies and plans in use. In the mining industry where exploration has been carried out largely by local prospecting in a random manner it is equally important to utilize all possible aids.

Major oil companies employ plans which frequently embrace entire states, without actually owning any considerable acreage in the areas under exploration. The net effect of these long-term programs, supported by large amounts of organized capital, has been the thorough development of the science of exploration. The stability given to this scientific field has been substantial enough for men of great talent to have been willing to devote their entire lives to its cause. With a growing opinion that the petroleum reserves of the nation may dwindle in the future, the drive for additional discoveries has been greatly intensified. In this program all the tools of modern research are being employed without stint. As in other phases of scientific investigation, the field is now divided into highly specialized zones over which preside men of special talents and training.

The attitude of the modern explorer for oil is not unlike that of the medical diagnostician. If you suspected that you were not well, although no outstanding symptoms presented themselves, you would probably consult your medical adviser. He would examine your condition carefully, employing perhaps a dozen instru-

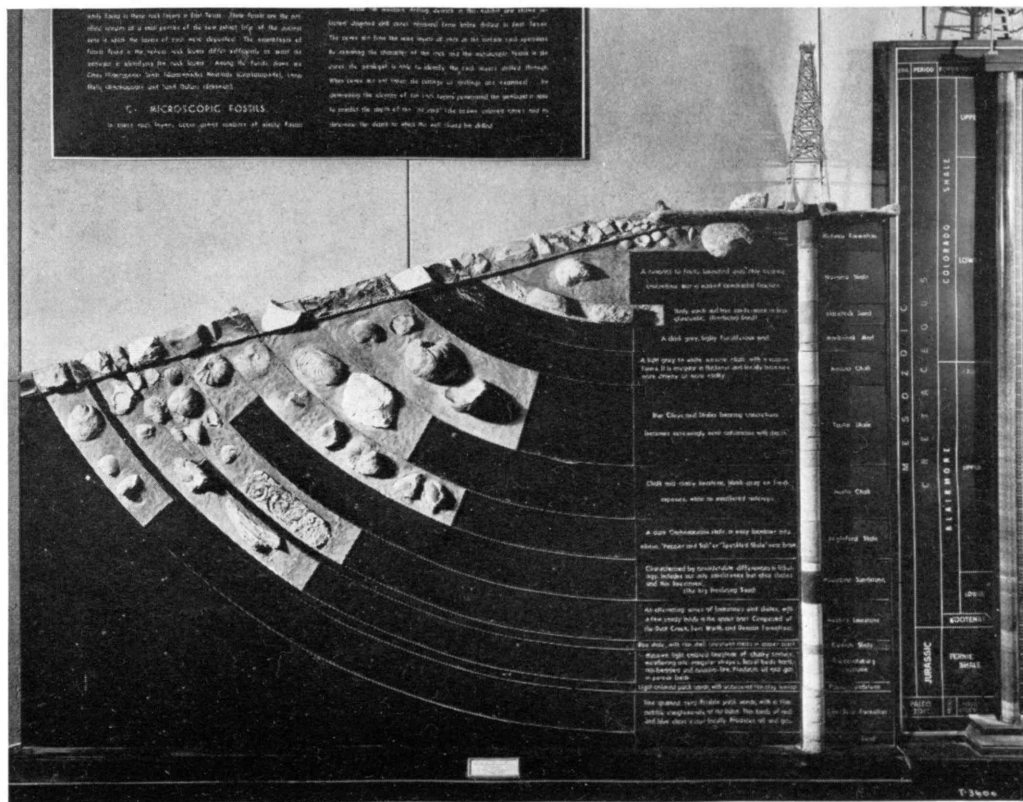
ments or methods of diagnosis. Among these might be cited at random the measurement of your body temperature, pulse rate, respiration, and weight. He might employ a stethoscope to listen to the sounds of your heartbeat or he might take an electrocardiograph for further diagnosis. Recent advances in medical research employ the measurement of the impedance of the body together with electrical records of the microvoltage waves generated by the brain and nervous system in action. The explorer for oil has at his command no less a comprehensive array of methods and equipment. Before going into these items in detail, let us trace briefly the concepts which lie behind the accumulation of petroleum in commercial deposits.

Early in the history of petroleum exploration a theory was developed which, with slight improvement, forms the basis today of all petroleum discoveries. This theory stated briefly that deposits of petroleum or natural gas might be found at the crests of ridges or domes in folded rock strata, due to their natural separation by gravity from the subterranean waters with which they are invariably associated. Soon after the successful establishment of the anticlinal theory in West Virginia, the search for these structural features in other areas became extensive. Up to the year 1925, practically all geological exploration in search of petroleum was directed toward a search for structures.

The methods of locating such structures are well known, but a brief outline of their application may serve to make the story complete. Anticlines are believed to have been formed by the action of stresses in the earth's crust incidental to mountain building and other tectonic forces. The causes of these stresses are diverse, and all that we need to recognize here is the fact of their

THE CORES

... shown under the drilling derrick in this exhibit come from East Texas fields and illustrate the manner in which the geologist examines the stratification of an oil region. Note that the dark brown sample is the "oil sand." The various rock layers can be identified by their fossil content, some outstanding specimens of which are shown on the left of the exhibit





Museum of Science and Industry, Chicago

Exhibit illustrating the use the geophysicist is able to make of the fact that rocks differ in density. Note the accumulation of oil in an anticline in the central diagram and below, the salt dome structure, along the sides of which the oil pools have formed (see opposite page)

existence. Since the portion of the earth's crust with which we are concerned is composed of layers of different formations, the folding caused by these stresses frequently forces ridges and domes above their natural elevation. Many such structures formed in the past are now visible at the top of the ground, and the geologist, by making measurements of the elevation above sea level of one or more continuous strata, can determine the extent to which such beds have been folded. By mapping a sufficient portion of the disturbed area, he can determine whether such folding has produced a closed structure, that is, one around which closed contours, showing planes of equal elevation, can be drawn. The keynote of his search is therefore closure. At the present time practically every acre of the petroliferous provinces of the United States has been subjected to surface geological surveys of this type. Many areas have been surveyed repeatedly for evidences which escaped early attention.

Supplementing the work of surface geological parties, there has also been considerable use made of aerial photographs. Because the nature of soil and vegetation often changes with the type of geologic formations exposed at the surface, these photographs frequently give striking evidence of geologic structures which are not

noticeable to an observer on the surface of the ground. Oklahoma City, Okla., and Kettleman Hills, Calif., are outstanding examples of fields observable by this means.

Sooner or later the geologist comes to areas where surface formations are not adequately exposed for the completion of his survey. In some instances resort is then had to the digging of shallow holes by means of hand augers or to the use of trenches. The purpose of such procedure is, of course, the exposure of key beds in salient positions. A widespread program employing these methods has the additional advantage of yielding data in points where needed rather than in points where exposures are more or less accidental. The extension of this phase of the work leads naturally to core drilling, which embraces all means of obtaining, by drilling methods, samples of rock formations below the surface of the earth. This practice was commercially developed in 1917.

By the end of 1915 practically every oil company in the field maintained a comprehensive geological department. The primary basis of oil exploration at that time was geological and, as has been pointed out elsewhere, fortunately this science was then developed to a point where it would be of real use to the industry. At the present time the science of exploration is in the hands of groups of technicians numbering in excess of 3,000.

At about the same time a noteworthy advance was made which greatly enhanced the utility of the geologist in the location of buried structures. This was the employment of information obtained in drilling wells for the development of subsurface geologic maps. Later another tool was added in the use of micropaleontology, the identification of sediments through study of microscopic animal remains.

In addition to the trap for petroleum deposits afforded by the closed anticline, geologists have come to recognize the existence of traps closed by other agencies. Closely allied to the anticlinal trap is that of the faulted structure wherein closure on at least one side is afforded by the vertical displacement of the entire geologic section on one side of the fault. Many faulted structures are readily observed at the surface of the ground, an outstanding example of this type being the Mexia-Powell fault zone of Texas.

The geologist, in making his studies of surface and subsurface formations, is dependent upon the availability of suitable data in the proper location. Surface formations outcrop and offer exposure at locations which may not meet the geologist's requirements for distribution. The cost of drilling deep wells for geologic data alone is too great for widespread use. Not unnaturally, therefore, in 1922 tools and methods were brought into use from fields foreign to that of the geologist, and a new combination of sciences — geophysics — sprang into prominence. The earliest of these efforts was the importation from Hungary of the torsion balance, which measures changes in the distribution of gravity at the surface of the earth. In 1924 the first Texas salt dome was discovered by the use of this instrument. The gravity anomalies offered by the low-density masses of salt which had intruded into the heavier sediments of Texas and Louisiana Gulf Coast were centers of intense interest from 1924 until 1930. Since that time less ob-

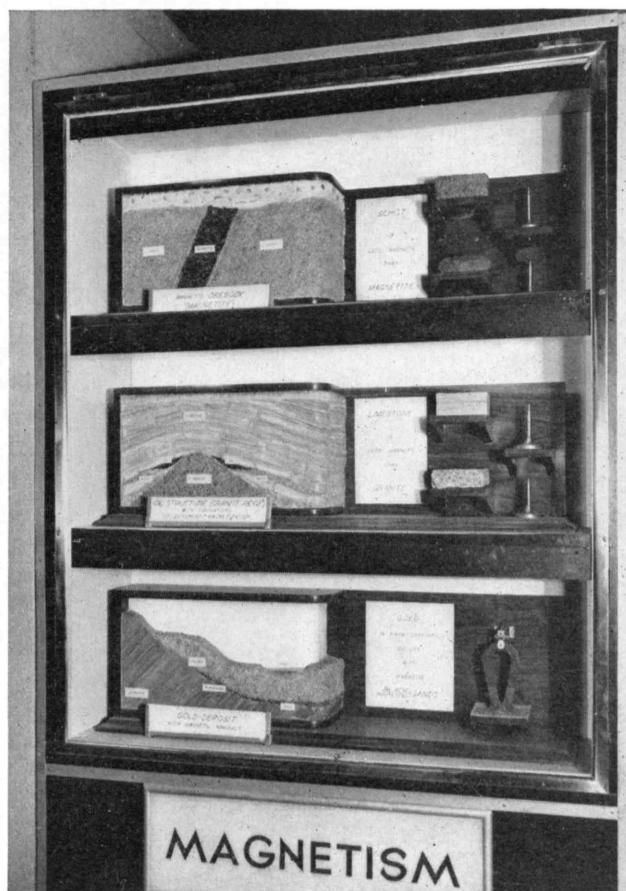
vious anomalies of the gravitational type have been discovered in the Gulf Coast provinces with more refined technique. It is now held that merely the uplift of overlying sediments by very deep salt plugs may be the basis of many of these anomalies. Inasmuch as petroleum deposits are contained within the sedimentary formations overlying these domes, as well as on the flanks, many of the deeper structures have developed great production.

At the present time considerable use for reconnaissance purposes is being made of the torsion balance, the gravity pendulum, and gravimeter in all petroliferous areas of the United States. The basis of many of these surveys is frequently conjectural and yet with the difficulty in discovering new fields no advantage should be overlooked. Because of the relatively low cost of gravity reconnaissance surveys, their use is frequently a standard practice, and they form one of the important methods of diagnosis.

In 1924 the use of the refraction seismograph was introduced into the United States for the purpose of detecting the presence of salt domes by virtue of the enhanced speed of travel of sound, or seismic waves, through salt. Since the average velocity of propagation of sound through Gulf Coast sediments ranges from 6,000 feet to 12,000 feet per second, whereas that through salt masses is of the order of 16,000 feet per second, a high degree of differentiation is available. The success of the refraction seismograph in the years 1924 to 1930 has never been, and probably never will be, achieved by any other single method of exploration.

The attempt to map stratigraphy in geologic provinces characterized by sharp planes of sedimentation was a logical development of the use of the seismograph for the location of salt dome structures. Propagation of sound through a stratified medium is essentially a problem in geometric optics, and once the possibilities were suggested, the method became exceedingly powerful in areas where the degree of stratification was sufficient for its application. One of the most notable programs of geophysical investigation was carried out along this plan in the Permian Basin of West Texas and New Mexico during the years 1928 to 1931. In this province the presence of thick beds of rock salt and anhydrite offered ready means of differentiation from the overlying low-velocity red beds. An unanticipated discovery of the stratigraphy of this region was the further increase in velocity of sound shown by Permian limestones.






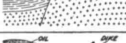








Through the continued application of the *refraction* seismograph to the delineation of structural features, the principle of the *reflection* seismograph was developed. This instrument achieves the determination of the depth of any of a series of hard-rock formations overlain by those of lower velocity, because a sharp echo, or reflection, is produced when a sound wave encounters the interface. By determining in advance at the location of a well the average vertical velocities in the geologic section, it is possible by timing the travel of the reflection wave to determine the depth to the reflecting horizon. A geophysical survey employing this method is essentially a step-by-step method wherein a prospect is covered with a network of points sufficiently dense to permit evaluation of the structural (Continued on page 380)



Museum of Science and Industry

Exhibit illustrating the manner in which magnetism aids the geophysicist. The oil above the intrusion in the center was located because limestone is less magnetic than granite, a fact of value for the Midcontinent and Mississippi Embayment province (see page 385)

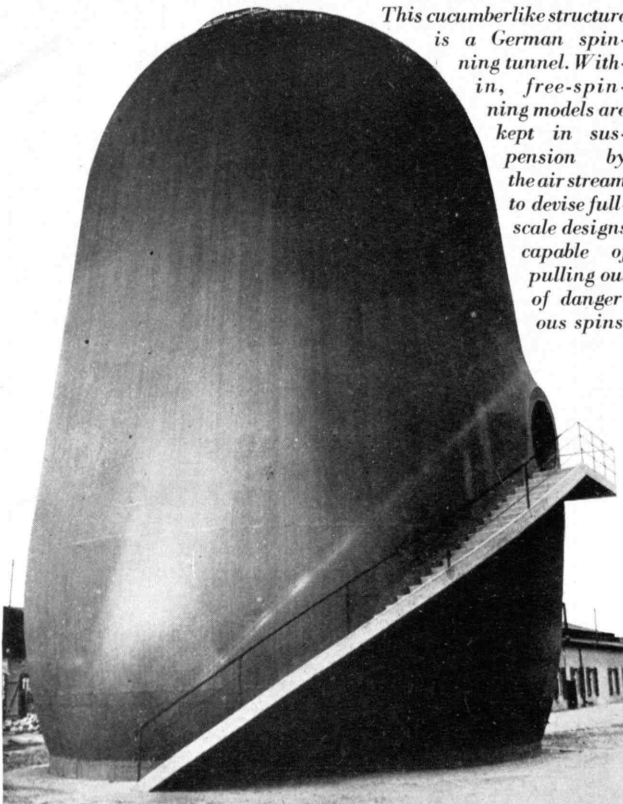
Below. Table prepared for the American Petroleum Industries
Exhibit at the 1933 Century of Progress in Chicago

CHOICE OF GEOPHYSICAL METHODS IN OIL PROSPECTING						
LOCATION OF POTENTIAL OIL STRUCTURE	TECTONIC	ANTICLINES		RECONNAISSANCE	DETAIL	
		DOMES		2	1	REFLECTION SEISMIC
		MONOCLINES		1		MAGNETIC
		TERRACES		3	2	TORSION BALANCE
				(1)	3	REFRACTION SEISMIC
				(2)	4	RESISTIVITY, INDUCTIVE
		FAULTS		1	1	REFLECTION SEISMIC
				2	(1)	TORSION BALANCE
				(2)	(2)	MAGNETOMETR
				(3)	3	RESISTIVITY
				(3)	INDUCTIVE	
VOLCANIC	DIKES		1	1	MAGNETIC	
	INTRUSIONS		2	2	TORSION BALANCE	
			3	3	SEISMIC	
SALT	SALT DOMES ;		1	3	REFRACTION SEISMIC	
	SALT-		2	1	TORSION BALANCE	
	ANTICLINES		3	2	REFLECTION SEISMIC	
			(1)	3	RESISTIVITY, INDUCTIVE	
					PENDULUM	
BURIED RIDGE	GRAHITE RIDGES		1		MAGNETIC	
	OTHER BURIED TOPOGRAPHIC FEATURES		2	2	TORSION BALANCE	
			(2)	2	REFLECTION SEISMIC	
			3		PENDULUM	
LENSING	(SHOESTRING)			1	RESISTIVITY, MAGNETIC	
BRIEF LOCATION OF OIL	IN WELLS	SEE CHART IN I.L.E. CORNER		1	ELECTRICAL LOGGING	
	FROM SURFACE	PROVEN ONLY FOR SHALLOW DEPTHS			RESISTIVITY	



Black Star

This cucumberlike structure is a German spinning tunnel. Within, free-spinning models are kept in suspension by the air stream to devise full-scale designs capable of pulling out of dangerous spins



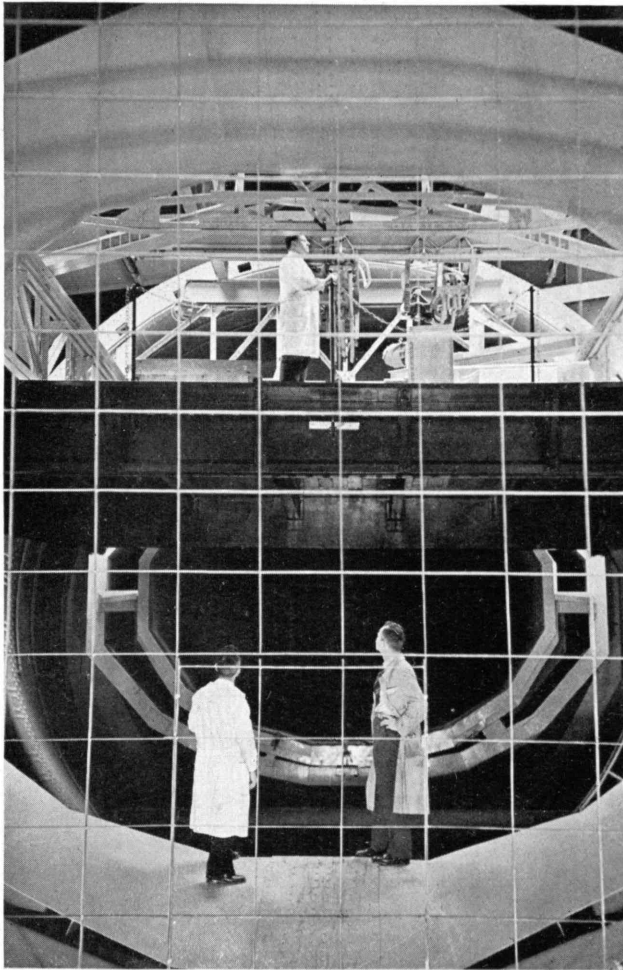
Pictures, Inc.

Wind Tunnels Are Spectacular

AND they are monuments to man's failure to solve a series of equations — the equations of motion of a slightly viscous fluid such as air. Because these equations have not been solved, the aeronautical engineer must derive much of his data from wind-tunnel experiment rather than from what the experimentalist wryly calls "pencil pushing."

A few tunnels, like that at Chalet-Meudon and the great 60-foot one at Langley Field (see opposite), are large enough to permit a limited study of full-sized aircraft under controlled conditions, but the excessive cost and power involved in these great plants prevent them from being duplicated. Most tunnels, therefore, are built for models — the study of flight in miniature — and here the engineer comes up hard against that famous index in fluid mechanics known as the Reynold's number. The model under test should have the same R.N. as the full-sized plane it represents; *i.e.*, for the model and for the full-sized plane, the product of speed, wing spread, and air density, divided by the air viscosity, must be the same.

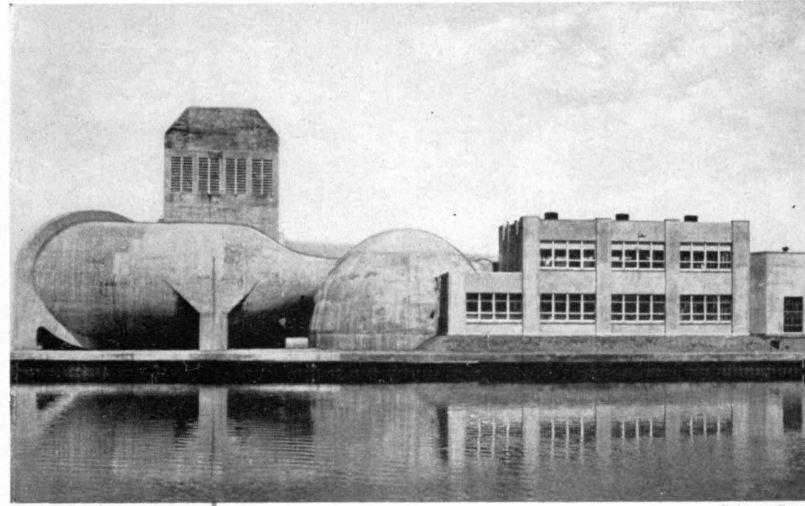
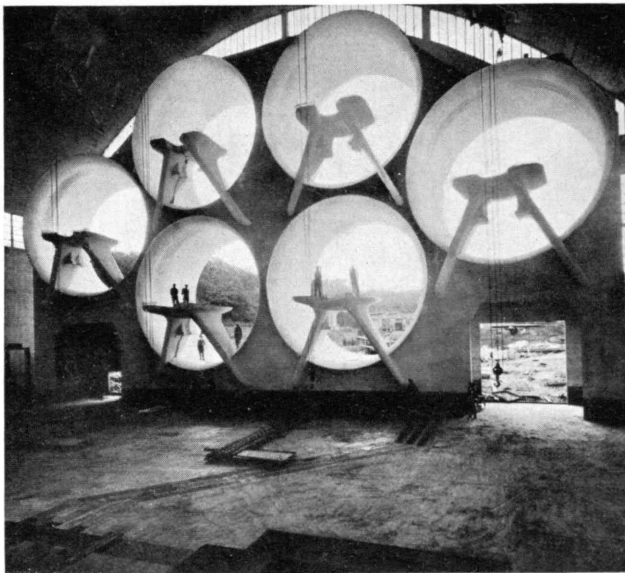
Conditions yielding a Reynold's number comparable to full-scale flight are obtained by varying the pressure within a closed tunnel. For a description of the Wright Brothers tunnel, the latest effort to control the Reynold's number over a wider range of conditions, see the second page following.



Black Star

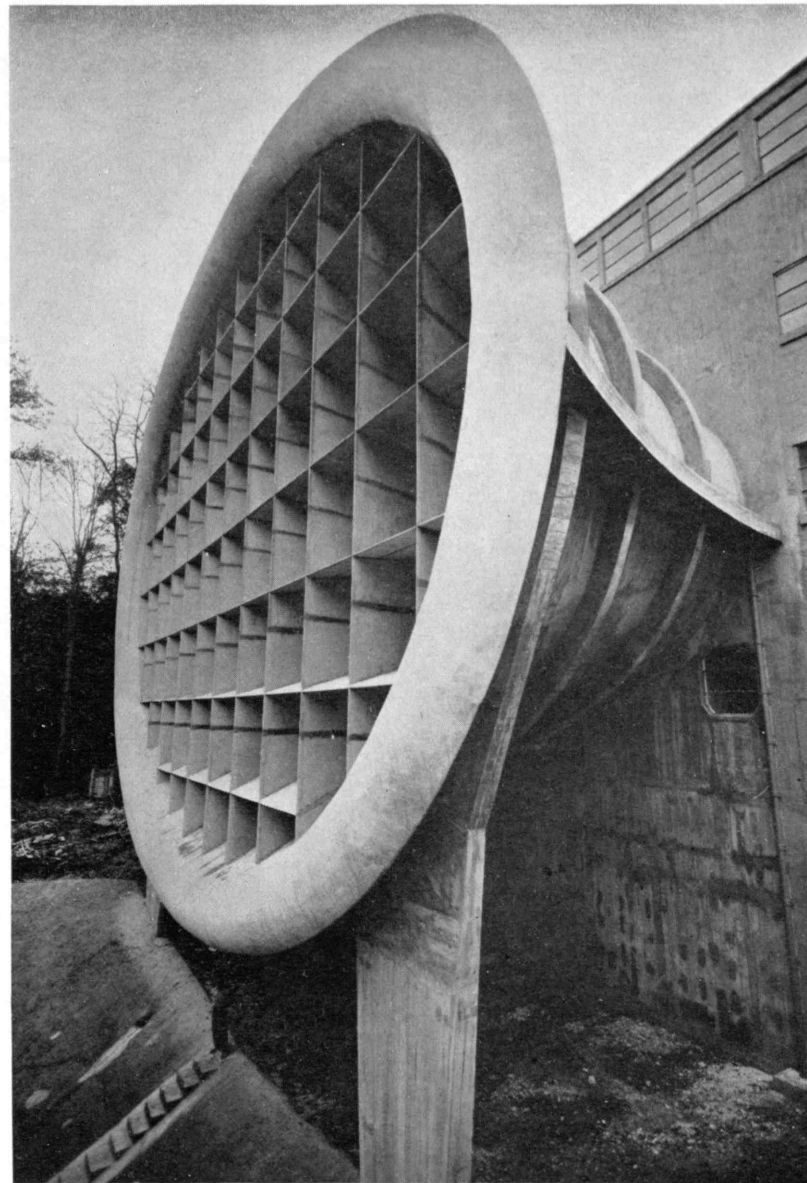
Above and opposite. Interior views of the return-current, open-jet wind tunnel of Göttingen. The vanes shown on the opposite page direct the air around one of the four bends in the tunnel. The open-jet area, where the model to be tested is suspended, is shown above.

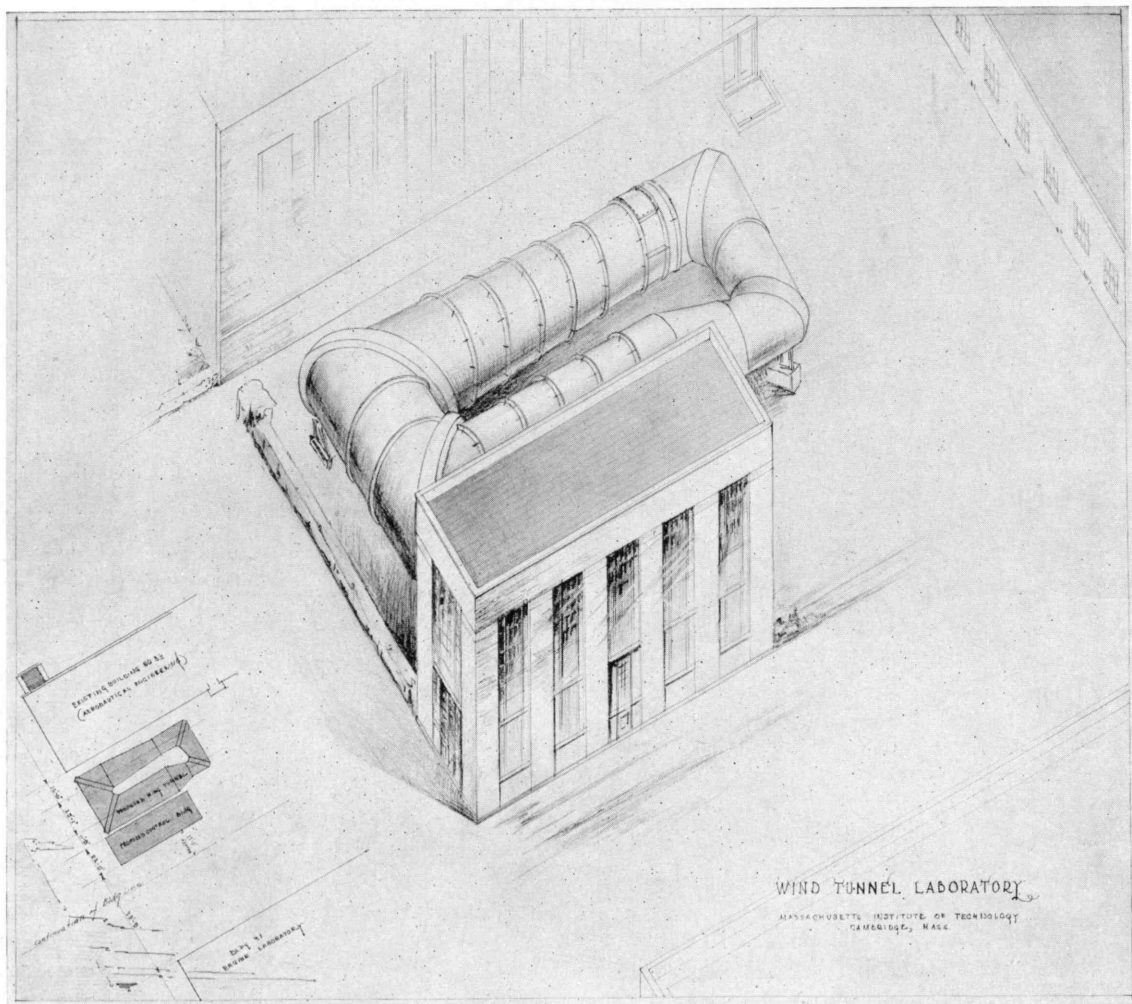
Right and below. The huge tunnel built by the French Aeronautical Technical Service at Chalet-Meudon to test full-sized planes. At the right is the intake and below is the housing for the six propellers that pull air through the tunnel at 113 miles per hour



Science Service

Above. The great compressed-air tunnel built at Langley Field by the N.A.C.A. In such a closed tunnel it is possible, with accurate models, more nearly to reproduce the conditions of full-scale flight





The Wright Brothers Wind Tunnel

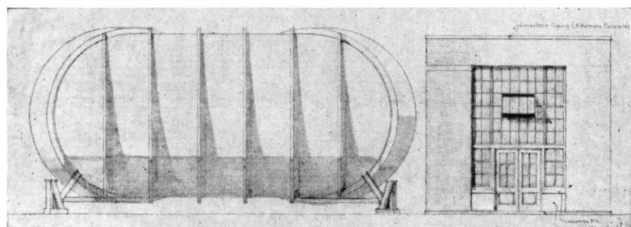
THIS new tunnel (of which a prospective drawing and the south elevation are shown), now under construction at M.I.T., is designed to provide a wider range of conditions than any existing American wind tunnel offers at present. It will develop wind velocities up to 400 miles an hour and simulate variations in barometric pressure up to theoretical altitudes of 35,000 feet — capabilities that presage advances in aeronautical engineering research. The tunnel may be operated under pressures up to four atmospheres, which will yield a Reynold's number comparable to full-scale flight, or it may be operated below atmospheric pressure, enabling studies to be made of substratosphere flight at high speed. The tunnel will thus be unique, in that it com-

bines means for operating at a high Reynold's number to study skin friction, turbulence, and flow separation with means for study of high-speed phenomena. Two thousand horsepower will be available to drive the fan.

Wind tunnels such as this one are useful not only in aeronautics; they are helpful in the design of any kind of machinery that handles fluids, such as fans, windmills, turbines, and pumps, and they are useful in instructing future aeronautical engineers in the mysteries of aerodynamics.

With the increasing speed and size of aircraft, our existing wind tunnels have become obsolete. In this country only the great Langley Memorial Laboratory of the National Advisory Committee for Aeronautics has equipment operating near full-scale R.N.

This new tunnel doubtless will not be available for such ulterior use as the one recently suggested by a national magazine. A bright young editorial writer sought vainly to borrow a wind tunnel in which he could suspend several women and determine the amount of wind velocity necessary to remove from their heads and blow to destruction the currently popular chin-strapped hats.



Converting Sunlight into Power

The Cabot Solar Energy Fund and the Exciting Research Program It Will Support

A QUEST for methods of harnessing the inexhaustible energy of the sun in the form of useful power is about to begin in a broad program of chemical, physical, and electrical research at the Institute. This great undertaking, the potentialities of which stagger the imagination, is made possible by the foresight and generosity of Godfrey Lowell Cabot, '81, a life member of the M.I.T. Corporation, whose long interest in solar energy prompted him to offer Technology a capital gift of \$647,700 for studies in this field.

The income of Dr. Cabot's gift, which will be known as the Solar Energy Fund, is to be devoted specifically to a long-range search for direct methods of converting the sun's energy into power or storing such energy for future use. After 50 years the income of the fund may be used for such other purposes as the Corporation of the Institute may select. In beginning this solar energy research program, President Compton and Dean Bush, '16, propose to enlist the coöperation of numerous senior members of the present staff who, with additional assistants and special equipment, will have the opportunity to accelerate and expand current research projects bearing on this exciting field, advance their own studies, and at the same time guide students in a research of great educational value.

The enormous potential power in solar energy is revealed by measurements which show that solar heat reaches the earth in the Temperate Zone at the average rate of about 4,000,000 calories per square yard per day. During the three months of greatest sunshine, an acre of land receives directly from the sun an amount of heat equivalent to burning approximately 250 tons of high-grade coal. This measurement indicates that unobstructed solar radiation, transformed completely into useful energy, would produce approximately one horsepower per square yard. The heat output of the sun in a year has been estimated by Charles G. Abbot, '94, Secretary of the Smithsonian Institution, to be equal to the burning of 400,000,000,000,000,000,000 tons of anthracite coal.

This energy determines our climates, causes winds, ocean currents, and rainfall, and produces photochemical reactions whereby a portion of the energy is stored in plants. Thus, solar energy is the ultimate source of our fuels—wood, coal, oil, and gas—as well as of power derived from wind or falling water. However, the stores of fuel energy in coal, oil, and gas, while great, are not inexhaustible. It is therefore of ultimate importance to investigate and develop alternative sources of heating and power. Furthermore, there are situations where other sources are even now more advantageous, and undoubtedly such possibilities can be extended by further study.

To this end Dr. Cabot established at Harvard University, in 1937, the Maria Moors Cabot Foundation

for Botanical Research for studying the growth of trees or other plants, with primary interest in increasing the storage of solar energy in the form of fuel as a plant product which can be grown as a crop. The present efficiency of plants as converters of solar energy into fuel energy is such that in favorable circumstances about two- or three-tenths of one per cent of the sun's energy falling on a tract of land in the growing season can be captured by plants grown on the land.

Recognizing that economic utilization of solar energy is possible through agencies other than plant fuel and desiring to establish the research program on such a broad basis as to seek solutions from all promising avenues of approach, Dr. Cabot established the Solar Energy Fund at the Institute to promote and support efforts to make solar energy economically available through application of physical, chemical, and engineering principles.

Because of the enormous amount of solar energy freely available, the practical problem is not to find means of using it with a high percentage of efficiency but rather to find methods that will be cheap enough to make solar energy economically useful. To this end



Berkeley

GODFREY LOWELL CABOT, '81

... who has made a capital gift of \$647,700 to Technology to initiate and support a research program in the utilization of solar energy

the first objective will be to determine whether the direct use of sun energy is now economical and feasible and, if so, where, for what purpose, and under what conditions. This will involve the evaluation — on the basis of first cost, maintenance, and output — of those devices for this purpose already proposed, studied, and published by scientists everywhere. This first objective will also require a study of new designs in order that they may be better adapted for their purposes. A second step will be a study of the feasibility of developing new conversion equipment, utilizing phenomena at present under study in physical and chemical laboratories and of ultimate promise in economical sun-energy conversion. A third phase will be a long-range basic development of knowledge of phenomena at present under study, which may become practical for sun-energy conversion in the more distant future. This might be brought about through changes in the general economic value of our present sources of heat and power or through improvement of the efficiency and lowering of first cost of equipment based on unusual physical and chemical processes.

In order that the solar energy research may have the highest educational value, student investigators will have opportunities to participate in it, under the guidance of members of the Faculty who will be in charge of various phases of the investigation. Thus the Institute's long-established plan of coordinating professional education with research will be extended into a new and promising field of knowledge.

The solar energy research program contemplated by the Institute may be divided into three major fields of investigation. The first of these is a study of means for utilizing solar heat to operate engines to deliver mechanical power. The second is the possibility of employing electrical apparatus for converting solar radiation into electrical energy. The third will consider chemical conversion of sunlight into forms available for work.

The approach to the problem of heat engines holds exciting possibilities, for so far as is known no comprehensive scientific study of the subject has ever been made. There have been many attempts in which mirrors were used to concentrate sunshine as a source of energy for heat engines but, while some of them have been technically successful, they were economically unsound. The problem of economically collecting the sun's heat is a baffling one and should not be circumscribed by the requirements of engines of conventional conception. It is proposed, therefore, to approach the study by considering engine design and development of the heat collector as a unit problem.

The study of engines capable of effectively using the collected solar energy contemplates machines capable of operating on a low upper temperature and with a comparatively small temperature range, of small first cost and maintenance per horsepower hour of output. Engines having this low-grade heat input may deliver their output in several forms, such as mechanical power on a shaft, or in the form of compressed air. Two types of engine invite immediate study. The first is a vapor power plant, similar to the steam engine but using liquid of higher vapor pressure than water. This type might be either a reciprocating engine or a turbine. The

other is a modernized hot-air or caloric engine which might be used to supply compressed air or mechanical power.

Research on electrical apparatus for utilizing solar energy suggests three interesting approaches. These are vacuum or gas-filled photoelectric cells, thermopiles, and boundary-layer apparatus, such as the copper-copper oxide cell. None of these has been successfully adapted to convert sun energy for power purposes. Although all are notoriously inefficient, one cannot assume that further knowledge and its application may not entirely change the situation. If it should, the possibilities are enormous.

The photoelectric cell, in its present form, seems to have an upper limit of efficiency which is far too low. However, there are new forms appearing which are worthy of serious study. The thermopile appears to be limited in efficiency by the Wiedemann-Franz Law, but there may be special forms to which this does not apply. The thermopile is not a promising energy-conversion apparatus for fuel firing. In sun-energy conversion, where efficiency is secondary, the problem is reduced to one of over-all cost per unit of output. This aspect does not seem to have been seriously studied.

Boundary-layer equipment is evidently in its infancy. An essentially empirical approach has produced useful equipment, and there have been popular descriptions of its possible use for transforming sun energy. The primary need in the attack on this problem is more basic knowledge. Specifically, science needs to know more about the behavior of electrons and ions in solids and especially at boundary layers. The development of such knowledge may well be accompanied, as it proceeds, by frequent practical studies of possible applications. It is evident today, however, that much more information is needed before specific applications can be successfully planned. On the other hand, the ignorance is so vast at present that there remains the possibility that developments in this direction may supersede many other means of power conversion and provide an inexhaustible source of cheap power. Some unique phases of research in this field of boundary layers are now being vigorously prosecuted at the Institute.

Chemical conversion of radiation into useful forms of energy is considered one of the important approaches to the utilization of sun power. There is the possibility of eventually discovering chemical compounds that can absorb sun energy and convert it into stored energy for economical power production. In such studies of the reactions between organic compounds and radiation, the Institute's spectroscopic laboratory is expected to be of great assistance. Still another approach lies in the pioneering research on colloids now being carried on in the Department of Chemical Engineering.

To assist in the coordination and direction of this impressive program of fundamental research, President Compton has appointed a committee, the members of which are Professors Hoyt C. Hottel, '24, of the Department of Chemical Engineering, Arthur C. Hardy, '18, Department of Physics, Ernest H. Huntress, '20, Department of Chemistry, Arthur R. von Hippel, Department of Electrical Engineering, and George W. Swett, '03, Department of Mechanical Engineering.

THE INSTITUTE GAZETTE

PREPARED IN COLLABORATION WITH THE TECHNOLOGY NEWS SERVICE

Graduation

CHARLES D. MAGINNIS, the distinguished architect and now President of the American Institute of Architects, will make the Commencement address at the 71st graduation exercises of the Institute in Symphony Hall on June 7. A native of Ireland, Mr. Maginnis was educated at famed Cusack's Academy, Dublin, and also in England, where he was winner of the Queen's prize in mathematics at South Kensington. He came to the United States in 1885 and founded the firm of Maginnis and Walsh, a name which is associated with a number of notable ecclesiastical and college buildings in this country.

It is particularly appropriate that an architect should be asked to make the address, for this year's Class will include the last graduates in architecture to study in the original Rogers Building. In a few weeks that fine old structure will be a place of deep shadows, and next autumn the undergraduate architects will join the other Institute students in Cambridge. Then old Rogers, with its high ceilings and dark molded woodwork, Huntington Hall, and the Commons Room where once a forge flared, will have become part of Technology's history.

Following the custom of many years, Alexander Macomber, '07, has been chosen chief marshal of the graduation exercises, and the invocation will be offered by the Rev. Leslie T. Pennington, minister of the First Parish Church in Cambridge. Those graduates who are appointed second lieutenants will receive their commissions from Brigadier General William H. Wilson, commander of the First Corps Area. The officers of the 25- and 50-year Classes will, of course, have places of honor in the Commencement procession.

Ballot Results

DISTRESSINGLY small were the returns this year on the Alumni Association ballot, although the meager returns may be easily explained by the competition for attention provided by the Alumni Fund Campaign. It was nevertheless interesting to observe that the balloting for membership on the National Nominating Committee was highly competitive and very close. In District 8, William J. Sherry, '21, of Tulsa, Okla., was victor; in District 9, George M. Gadsby, '09, of Salt Lake City, Utah; and in District 10, Ernest B. MacNaughton, '02, of Portland, Ore. In one district the winner led by only 23 votes. Obviously the competitive plan for election to the National Nominating Committee is working well.

For offices which contained only one nomination on the ballot the recommendations of the National Nominating Committee, as recorded in *The Review* for March, prevailed. The new officers now ratified will be: for President of the Alumni Association, H. B.

Richmond, '14; for Vice-President for two years, Raymond Stevens, '17; members of the Executive Committee for two years, Hovey T. Freeman, '16, and Edwin D. Ryer, '20; and for Representatives at Large for two years on the Alumni Council, Eric F. Hodgins, '22, Jerome C. Hunsaker, '12, Van Rensselaer Lansingh, '98, Winfield I. McNeill, '17, and Theodore B. Parker, '11. The three nominations for term membership on the Institute's Corporation were likewise ratified: Harry P. Charlesworth, '05, Marshall B. Dalton, '15, and Donald G. Robbins, '07.

198th and 199th

W. RUPERT MACLAURIN, Assistant Professor of Industrial Relations in charge of Institute work in this field, and Dr. Douglass Vincent Brown, also Assistant Professor of Industrial Relations, were the guests and principal speakers at the regular monthly meeting of the Alumni Council on March 28. Professor MacLaurin made a most interesting general presentation of this very timely subject, including the plans and objectives of the Institute work which differentiate it from that in other institutions which are studying the problem. Dr. Brown continued by dealing more specifically with the library material which is being gathered on the subject and with specific questionnaires which, having been circulated at one plant, developed some highly illuminating information.

The general subject of labor relations drew fire from the Council in a degree which has not been equaled since the lamented discussions on football. Prominent industrialists who were present were moved to defend themselves, and the whole discussion, in very friendly vein, was full of sparks of wit. During the business session it was voted to make the changes in the by-laws dealing with graduated life membership and class affiliations which had been officially presented to the Council with the minutes of the January meeting. These changes substitute for the present single life membership fee of \$75 a graduated fee ranging from \$75 at age 30 to \$50 after the 55th birthday. In other words, the life membership fee has been placed on an actuarial basis and is therefore, under the new plan, a better and more attractive investment for Alumni.

The 199th meeting, held on April 25, was also graced by two guest speakers, this time from neighboring institutions. The subject for discussion was the relation of Alumni to a university, and this discussion was ably led by two men who are nationally famous for their work in alumni circles: Sidney C. Hayward, Editor of the *Dartmouth Alumni Magazine* and Secretary of Dartmouth College, and Herbert F. Taylor, Alumni Secretary of Worcester Polytechnic Institute and one-time President of the American Alumni Council. Mr. Hayward dealt particularly with the relations of Dart-



CRYSTALLIZED PHOTOGRAPHIC EMULSION

Each year the M.I.T. Faculty Club holds an exhibit of photographs contributed by members of the Technology staff and student body. Above and opposite are two prints drawn from the 1938 exhibition.

The above photograph, by John M. Holeman, '38, resulted when a microscope slide, coated with an experimental silver bromide emulsion, was accidentally left in an oven for three months. The silver bromide crystallized, and on development the crystals were reduced to metallic silver. To make the print, the slide was photographed with a photomicrographic camera onto two five-by-seven plates which were enlarged separately. Close examination in certain areas will disclose the shape of the individual crystals of which the pattern is composed. This is probably the first time that this phenomenon has been exhibited

mouth College to its Alumni. He explained the very interesting arrangement whereby there is an Alumni Council made up of representatives who actually get together from all parts of the nation once a year and the system by which Alumni take a very active part in the selection of students who are to attend Dartmouth.

Mr. Taylor spent some time in discussing the policies of Worcester Polytechnic Institute, whose problems, he rightfully stated, were quite similar to those of Technology. However, he enlarged the scope of his discussion to deal interestingly and amusingly with the proper relation of Alumni to an institution and traced the history of these relations: how Alumni were first ignored, how they then were seen as a good source for funds, how as a result of this they began to try to exert an influence in the conduct of the institutions and were for a time regarded by the heads of those institutions as a nuisance, and how today these relations have disappeared and the position of Alumni and administration is recognized as a mutually dependent one in which the Alumni are by no means only a source of money but a group whose advice and assistance in other directions is not only welcomed but courted.

Like the March meeting the subject of this evening evoked lively and interested discussion, largely in the form of questions.

New Awards

THE Order of Military Merit, newly established in the Institute's Department of Military Science and Tactics as an award for outstanding achievement in

that Department, was presented for the first time to 49 freshmen of the Reserve Officers' Training Corps at a review of the entire regiment on May 2. The award is based on qualities such as military bearing and neatness, attention to duty, coöperation, initiative, judgment and common sense, and leadership. Award of the order will henceforth be an annual ceremony at the Institute. The awards were presented in the presence of Lieutenant Colonel Charles Thomas-Stahle, '22, Head of the Department, and Assistant Dean Thomas P. Pitré, who reviewed the regiment.

To Edward F. Miller, '86

JUST outside the office where for many years he sat wreathed in the blue smoke of his famous cigars and met his staff and students, a bronze tablet has been erected in memory of the late Professor Edward Furber Miller, '86, Head of the Department of Mechanical Engineering from 1911 until his death in 1933 and a member of the staff from the day of his graduation. The tablet has been placed opposite one erected some years ago in memory of the late Professor Gaetano Lanza, Head of the Department from 1883 to 1911 and a pioneer in the development of testing methods in mechanical engineering.

It is particularly appropriate that both these tablets were designed and executed by the Mechanical Engineering Department, in the early development of which both men had so important a part. The designs are by Professor Arthur L. Townsend, '13, who, with generations of other students of Professor Miller, recalls his

famous story of the cherry-red boiler, the hasty summoning of the expert (Professor Miller), and the happy aversion of a disaster. The patterns were made and the casting done in the Institute's own foundry, and the tablets were finished in Technology's machine tool laboratory. These tablets are two of a series being erected as a project of the Alumni Committee on Historical Collections, of which H. B. Richmond, '14, is chairman.

Elected

THE election of Warren K. Lewis, '05, Professor of Chemical Engineering, to the National Academy of Sciences at its recent meeting in Washington, D. C., brings to ten the Institute's membership in the academy. President Compton, who was elected in 1924, is now a member of the executive committee of the academy as well as of the executive committee of its government relations and science advisory committee. Vice-President Bush, '16, was elected to the academy in 1934. Other members are Professors Jerome C. Hunsaker, '12, Norbert Wiener, John C. Slater, James F. Norris, and Professors Emeriti William Hovgaard, Waldemar Lindgren, and Arthur E. Kennelly.

Conversion by Sunshine

RESEARCH on the effects of sunlight on health has brought agreement among a majority of specialists that a portion of the beneficial solar radiation causes

the conversion of a chemical substance of the skin into the natural Vitamin D. This vitamin not only cures rickets in the young but has other beneficial effects on adults. The nature of the exact source of this chemical substance which, when exposed to sunshine, is converted into Vitamin D, has been debatable for some time and has been clarified by studies now being carried on at the Institute by Professor Nicholas A. Milas and Dr. Robert Heggie, '33, of the Department of Chemistry. These two scientists have produced this provitamin, as the chemical substance is known, by allowing enzymes isolated from fresh beef heart to act on cholesterol, a well-known solid alcohol manufactured by animal tissues and found most abundant in the brain and spinal fluids.

Pure cholesterol alone is not easily converted directly into the natural Vitamin D when subjected to sunshine or ultraviolet light. However, under the influence of dehydrogenating enzymes found in the body and in the presence of certain organic substances, the right number of hydrogen atoms are removed from the right position of the cholesterol molecule, and the substance produced is then easily converted into the vitamin itself by solar radiation or by ultraviolet light. This research has led the Institute's investigators to develop a simple process for the chemical production of this important provitamin directly from cholesterol, a process somewhat analogous to that carried on in the body. Vitamin D produced from this provitamin has been found to be more potent in human beings and considerably more potent when fed to growing chicks than the Vitamin D

SMOOTH RIDING FOR THE ZEPHYR

From a photograph shown in the Faculty Club exhibit by Alfred V. deForest, '11, Professor of Mechanical Engineering





M.I.T. Photo

HORN "ANTENNA"

A simple and efficient apparatus for producing a beam of ultrahigh-frequency radio waves has been developed by Dr. Wilmer L. Barrow, '29, in the Department of Electrical Engineering at the Institute. This electromagnetic horn antenna is expected to be useful in microray communication over a narrow pencil-like beam at wavelengths only a few inches long. Other applications may be in airplane and ship navigation. Dr. Barrow is shown adjusting the transmitter by which the waves are started from the square hollow tube into the throat of the horn

produced by the irradiation of ergosterol, another solid alcohol which is manufactured by yeast and certain molds.

Horn Waves

A SIMPLE and efficient means of producing a beam of ultrahigh-frequency radio waves, in which a flared metal horn is used to project the waves into space in much the same manner as acoustical horns concentrate sound waves in a beam, has been developed in the communications laboratories of the Institute by Dr. Wilmer L. Barrow, '29. This new development in directive antennae was described by Dr. Barrow in a paper presented at the recent joint meeting of the Institute of Radio Engineers and the International Scientific Radio Union in Washington, D. C. The electromagnetic horn should find early application to microray communication, in which the intelligence is sent over a narrow pencil-like radio beam at wavelengths only about a tenth of a meter long. Other applications may be made to airplane and ship navigation, and similar uses for which these very short waves are adapted. This range of wavelengths, roughly below one meter in length, is rapidly being explored and put to practical use. Already this horn antenna is being applied to the blind landing of airplanes in a research carried on at Technology for the Bureau of Air Commerce. Several microwave communication channels have been in use in Europe for three or four years, the one across the English Channel being, perhaps, the best known. These microwaves and the horn antenna appear to be almost ideally suited for application to the blind landing of airplanes under conditions of fog, snow, or rain, although a further increase in the reliability and ruggedness of the sending

and receiving apparatus is needed before the shorter microwaves can be advantageously employed.

The possibilities of radiating waves from electromagnetic horns was first described by Dr. Barrow in May, 1936, in connection with the transmission of telegraph, telephone, and television signals through hollow metal pipes. (See The Review for July, 1936, page 415.) Development of the horn was continued intensively from both experimental and theoretical angles. As a result it is now possible to design horns for particular applications with greater engineering precision than is possible for antennae of more conventional construction. One reason for the excellent agreement between calculations and experiment is that the waves are forced to follow the guiding surfaces of the horn straight out into space. Thus they cannot easily go back on connecting wires and supports, to be radiated in unintended directions.

Compared with other directive antennae that are used at microwavelengths, the horn developed at the Institute is peculiarly easy to operate since but one adjustment is necessary. The simplicity of construction of the horn, which can be made from sheet copper or galvanized iron, makes it an economical system to build. The fact that no insulators are used contributes to efficient operation.

One feature of the electromagnetic horn of rectangular cross section is that the sharpness of the beam in the two directions at right angles to its length can be controlled by varying the flares of the two sets of opposite sides. In this way, a fan-shaped beam may be sent out that is sharp in one plane and broad in another. By changing the shape of the horn, a cigar-shaped beam can be radiated. The sides of these beams are unusually clean cut and free from irregularities. It is these features that make the horn adaptable to so many uses and give it advantages over older types of antennae.

Waves may be started in the horn by locating a small rod antenna only a few inches long directly in its throat. Waves may also be started by connecting to the horn a hollow pipe carrying the ultrashort radio waves. The first method may be likened to an old-style phonograph, where the diaphragm and needle excited the sound waves directly in the throat of the now antiquated phonograph horn. The second method resembles a speaking tube connected to the small end of a horn.

Chemical Engineering at Technology

OUR series of Visiting Committee Reports continues this month with a condensation of the statement made to the Institute's Corporation by the Committee appointed to visit the Department of Chemical Engineering during the current academic year.

CHEMICAL ENGINEERING *

IN 1936 the Visiting Committee for the Department emphasized the Department's need for three more senior staff members and for more and better space for

* Members of this Committee for 1937-1938 are: Bradley Dewey, '09, Chairman, Arthur C. Dorrance, '14, Thomas Midgley, Jr., Samuel Cabot, '09, Frank W. Lovejoy, '94, Charles M. A. Stine, and Robert E. Wilson, '16.



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the staff. At its meeting on February 18 of this year, the Committee found that since that time the senior staff has been strengthened by the appointment of one assistant professor, who is now to be promoted to an associate professorship. One and possibly two more assistant professors will be nominated this summer. More space has been allocated to the staff. Though many of the senior staff are located in the basement, the arrangement of offices and their proximity to the research students is much better than at the time of the last meeting. This situation may serve for the present, but it is far from ideal for a staff of the size and quality of that in this important Department.

The enrollment in chemical engineering is now approximately $13\frac{1}{2}$ per cent of the undergraduate student body of the Institute and $18\frac{1}{2}$ per cent of the graduate group. Over 40 per cent of the graduate group are candidates for the doctor of science degree. The 118 graduate students include men from 65 different colleges. The enrollment of sophomores in the Course was cut at midyears of this year from 96 to 65, and it is felt that this step will help to improve the quality of the undergraduate training. The staff members are giving new courses in chemical engineering to students of other Courses.

In a new move to stimulate research productivity, six research assistants have been appointed this year. These men receive a small stipend and are engaged on doctors' theses which will require approximately 50 per cent more than the usual time. In consequence they are expected to turn out considerably more than the normal contribution which would justify the awarding of the doctor's degree, and to assist and stimulate the thesis research of men working for the masters' and bachelors' degrees.

With the foregoing background, the Committee discussed at length probable future trends and requirements of the Department. The following synopsis covers the points which it is thought should be of greatest help to the administration. There is no reason to fear that the Chemical Engineering Department of the Institute is about to lose its recognized leadership in the fields in which it has pioneered with the basic unit operations now commonly associated with chemical engineering.

However, the very thoroughness with which the Department has developed these unit operations (for example, distillation, heat transfer, and absorption) leads some to wonder whether the present staff and facilities are sufficient to permit the same type of pioneering in the new fields for which chemical engineers will be in ever increasing demand. The Committee also realizes (as does the Head of the Course) that the chemical engineer could profitably employ more knowledge of related subjects such as organic and physical chemistry, business, mechanical engineering, and metallurgy. Time limitations unfortunately prevent the inclusion of all the desirable work in the standard curriculum. It is felt that though it may not be necessary to do anything at this time about either of these points, they should be periodically reviewed, and students with bents toward particular subjects should be encouraged to follow them when selecting electives.

The Committee feels that the Department should actively encourage research in fields involving the application of chemical engineering to (1) processes incident to organic chemical reactions (e.g., nitration, sulphonation, polymerization) and those involving colloidal phenomena (the action of wetting and dispersing agents, detergents, softeners, plasticizers, and so on) and (2) some of the undeveloped unit operations, such as heat transfer in the low-temperature field, crushing and grinding, separation, classification, and mixing.

M.I.T. should bring to bear upon these fields new tools and methods of attack. The chemical engineers of the future must be equipped to solve the problems incident to developing continuous processes for now discontinuous chains of reactions of the new synthetic organic chemistry of today and tomorrow. The Committee feels that some of the Department's staff members should be encouraged to specialize in one or more of these fields and should be helped, as well as urged, to strengthen their contacts with, and knowledge of, industries that would broaden their appreciation of the problems in these fields.

The Committee feels that probable future interests in these fields should weigh heavily in the choosing of candidates for new senior staff positions, and the Department budget should include an appropriation to be spent, under the direction of the Department Head, to facilitate the making of contacts with, and the study of, such fields by the staff.

To summarize, the Committee feels that the program of the Department in the future must emphasize progress in all four of the following fields: (a) further development of the special unit operations that have been studied in the past; (b) similar unit operations that have been studied but little in the past; (c) processes involving the principal reactions of organic chemistry; (d) processes involving colloidal phenomena.

Without detracting from the foregoing major recommendations, the Committee wishes to approve continuing support of the Department's program of financial aid (independent of financial need) to research assistants in return for (1) more time and a better thesis and (2) some supervision of the thesis work of candidates for bachelors' and masters' degrees.

In closing, the Committee again emphasizes that its fears for the future are the result of the growth which has accompanied the Department's success in the past. It feels that the enthusiasm and genius which have resulted in present progress are ever growing, but that the problems to be tackled and solved are growing faster than the personnel available. It is this growth which makes the administrative problem a difficult one and which makes the Committee feel its responsibility to point out the considerations which should be weighed in spending the all too limited available funds.

Amber, the Arctic, and Cosmic Rays

IN New Zealand, in Peru and Mexico, in three stations in the United States, and at sea in the Pacific, cosmic-ray intensity meters have been in operation for some time in a world-wide investigation of cosmic radiation, which is being carried (*Continued on page 387*)

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Should I Trade In My Car?

A Method for Determining the Economic Time

BY VERNON G. LIPPITT

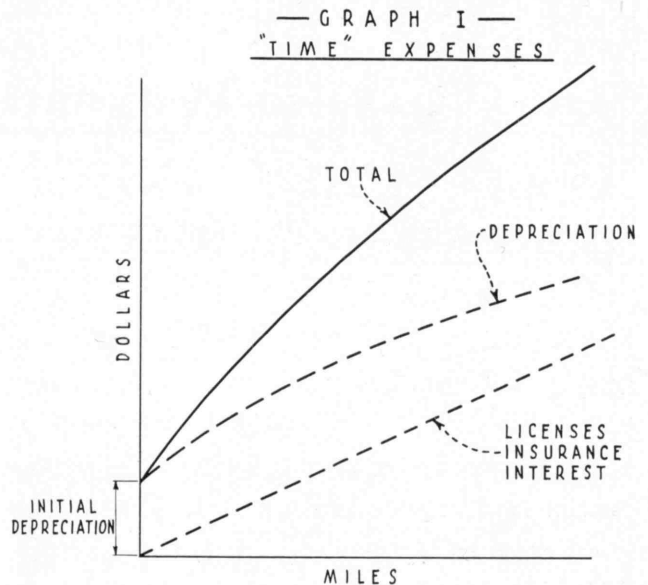
TRADING in your used car at the proper time will save you money. But how, you ask, can you determine the proper time? I have devised a method which, I think, will enable the car owner to determine the economic trade-in time, provided he has complete expense data. I assume, of course, that the owner can purchase a new car at the economically best time and that he is willing to disregard esthetic considerations, and I neglect the possibility of the sudden termination of the old car's life by breakdown or accident.

By the economic time to turn in your used car I mean the time at which the car should be turned in so that the cost per mile of your automobile transportation services during the life of this car and that of your next car shall be a minimum. I take the mileage traveled to be a measure of the transportation service given by the car and wish to find when the car should be traded in so that the cost of this service shall be a minimum not over the life of this car alone but over the combined lifetime of this and the next car, which is probably as far ahead as one can look. The essential factors in this determination are the foregoing ones. The depreciation cost is high when the car is new, and the operating, repair, and replacement costs rise as the car grows older. We want to find a point which strikes an economic balance between these two factors and which will give a minimum resultant cost per mile.

First of all, of course, we must have the expense data for the car in order to solve the problem. If your antipathy toward keeping an account of your car expense is greater than your desire to save money by turning in your car at the proper time, you will probably not bother with this problem. However, assuming that you are interested and assuming that we have the complete expense data to the present, we next need to select a method of treating the data to find the desired solution to the problem. My general method is to divide the expense items into two main groups: first, expenses dependent primarily on time, or age of the car; and second, operating expenses dependent primarily on mileage traveled. I shall determine these expenses independently and then combine them to obtain a graph of total car expense as a function of mileage traveled. And from this graph and calculations based on it, I shall determine the economic time to turn in the car.

Time expenses include driver's and car licenses, insurance, interest expenses, and depreciation. Let us first consider the items of licenses, insurance, and interest. Payments for these items are made in lump sums but should logically be charged equally to each week or month of the car's life. We can spread these expenses evenly by totaling the yearly expense for these items and finding the average cost per month. At the end of each month we can sum up these items of expense and plot the sum against the mileage indicated by the

speedometer at the end of the month. If you travel equal distances each month, the graph of these items of time expense will be a straight line from the origin upward at a slope proportional to the monthly average (Graph I).



The remaining item in the time expenses is depreciation. By depreciation expense I mean the difference between the purchase price of the car and the cash allowance you would get for the car on a trade-in. The cost of the car — initial and installment payments — does not appear in this analysis; the depreciation cost takes care of the amount you pay for possession of the car. Now the depreciation is not strictly dependent on time alone — it depends somewhat on the mileage traveled, the care given the car, and the model of new car you are going to get — but it comes closer to being dependent on time than on mileage, I think. So I have included it in the time costs. The amount of depreciation expense up to any time may be determined by taking the car to a dealer from time to time for estimates of trade-in value, or it may be predetermined by asking the dealer what is the depreciation schedule on the car. At any rate, when determined the depreciation expense may also be plotted as a function of the miles traveled since purchase. There will probably be some depreciation immediately upon purchase; so this curve will not start at zero dollars. The curves for the items of time expense may then be added to find the resultant variation of time expenses with mileage traveled (Graph I, again).

Now let us examine the operating, or mileage, expenses. These include gas and oil, garage servicing and repair, tires and other replacements, and miscellaneous expenses — in fact all car expenses not included under

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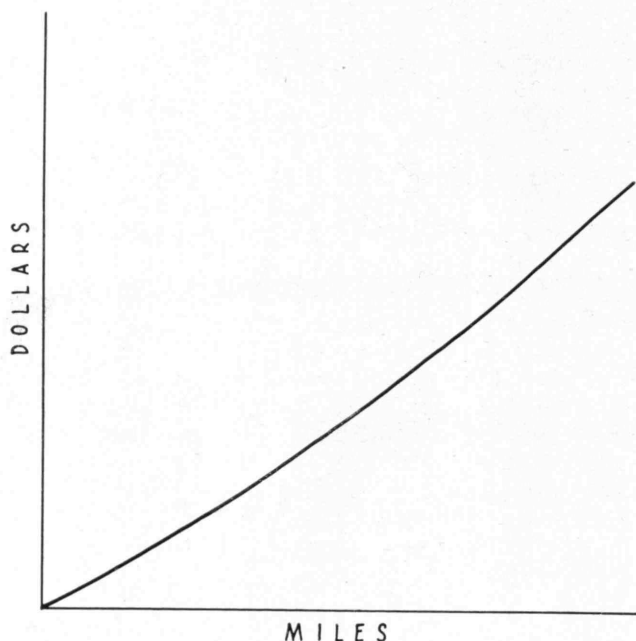
POSSESSING a simple dignity that architecturally is in harmony with other buildings of Massachusetts Institute of Technology, this new Structure is the fifth building to be constructed on the campus by Stone & Webster Engineering Corporation since the completion by them of the original group in 1916.

In the quarter century that has elapsed since Stone & Webster were retained for the construction of that group, the Engineering Corporation has completed at Tech, the Pratt School of Naval Architecture, Guggenheim Aeronautical Laboratory, George Eastman Research Laboratories of Physics and Chemistry, Spectroscopy Laboratory, and is now constructing the extension to the Institute Buildings on Massachusetts Avenue.

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— GRAPH II —
"MILEAGE" EXPENSES

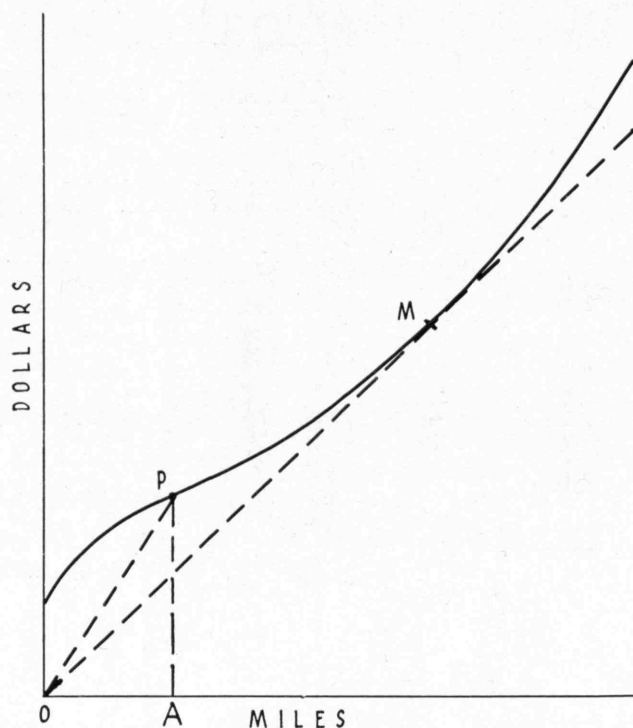


time expenses. These items may best be handled, I think, by simply adding them together, say at the end of each month, and plotting the total mileage expenses to date against the speedometer reading at the end of the month. Unlike the curve of time expenses, this graph cannot well be predicted much in advance but must be plotted as the actual expense data are obtained. This graph will have somewhat the shape illustrated in Graph II, rising at an increasing rate with distance traveled.

Adding the mileage costs and the time costs at all points, we obtain a graph of total car expense as a function of miles traveled since purchase (Graph III).

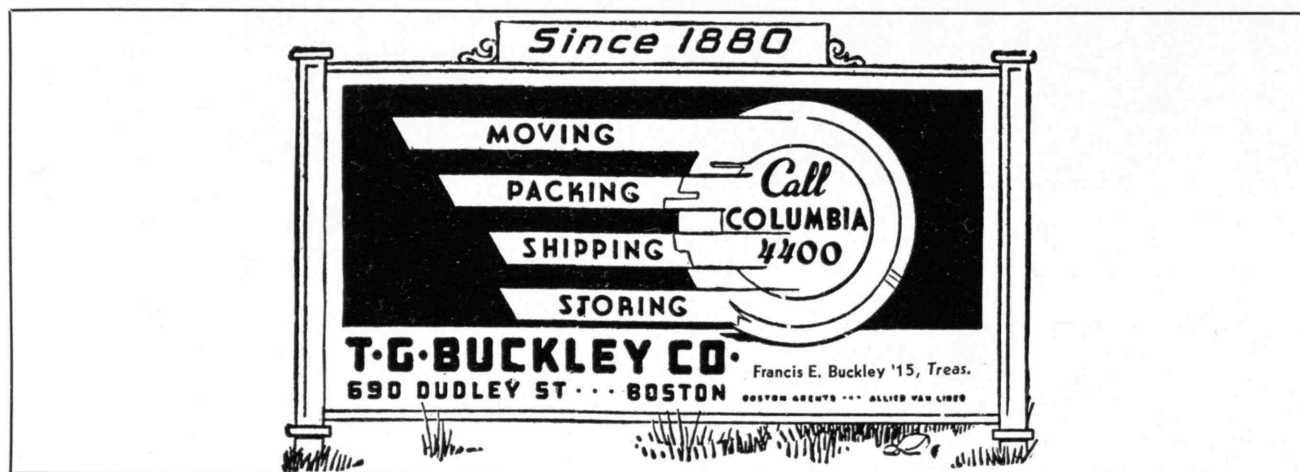
We know that the cost per mile of our transportation services up to any point in the life of the car is given by total expenses divided by total miles. Thus at point P the cost per mile is AP cents divided by OA miles. But AP/OA is a measure of the steepness of the slope of the line OP . So, in general, the average cost per mile up to

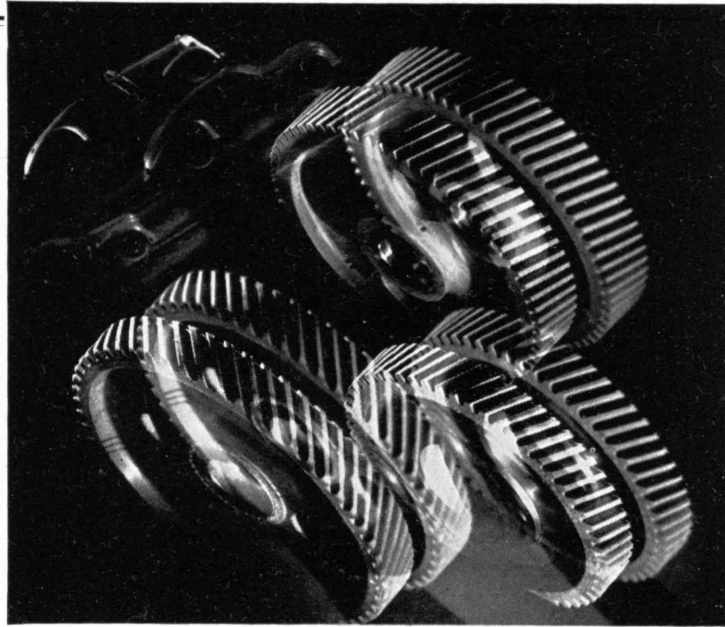
— GRAPH III —
TOTAL CAR EXPENSES



any point P in the car's life is proportional to the slope of the line OP on a graph with axes as shown, and to find the point at which the cost per mile is a minimum we have merely to determine the point on the expense curve for which the slope of such a line is minimum. On Graph III point M is obviously the point of minimum cost per mile.

However, point M is not necessarily the point at which to turn in the car. The fundamental criterion is that the car should be turned in at the point which makes the cost per mile of transportation service a minimum over the combined life of this car and the next. If one can estimate the average cost per mile which a new car will give and if it differs from the average cost per mile of the old car, then the optimum trade-in time can be located but will not fall at M . (Concluded on page 376)





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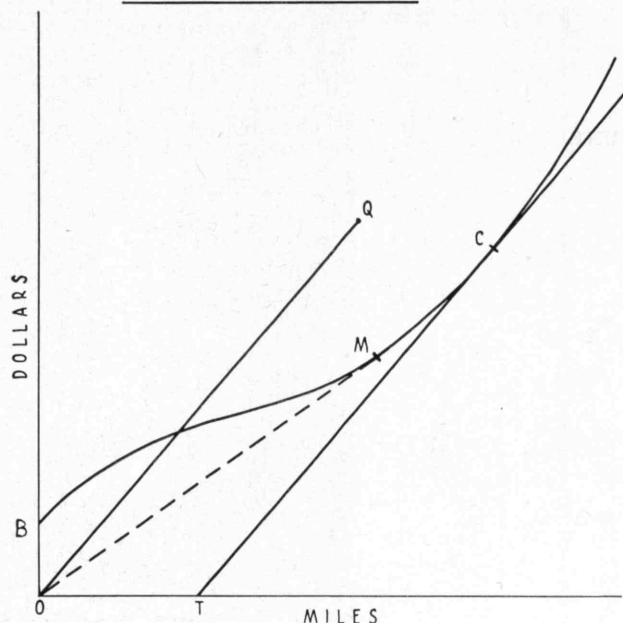
SHOULD I TRADE IN MY CAR?

(Concluded from page 374)

Suppose you estimate that the new car will give a minimum cost of four cents per mile. And suppose you are now at point *M* on the curve for the old car, for which the average equals three cents per mile. Let us assume that you keep the old car a month past the point *M*. During this month the old car might average three and one half cents per mile. Then it was economical to use the old car for that month rather than to buy a new car and get your transportation at four cents per mile. Let's then assume you keep the old car a while longer. At some later time the old car might average four and one half cents per mile over a monthly period. Then it would have been cheaper to buy the new car at the beginning of the month so that you could have obtained the month's transportation at four cents per mile rather than the four and one half cents per mile of the old car. In general, if the estimated minimum cost per mile for the new car differs from that for the old car, the economic trade-in time is that at which the cost per mile for the old car over a short period of time rises just to equal the minimum cost per mile for the new car.

Suppose that you had an expense curve like *BMC* (Graph IV), and suppose that a new car would give you a line *OQ* whose slope represents its minimum cost per mile, higher than the cost per mile at point *M* for the old car. The proper time at which to trade in the old car is at point *C*. The tangent to the expense curve for the

— GRAPH IV —
TOTAL CAR EXPENSES



old car is here parallel to the line *OQ*. Or, in other words, the cost per mile for the old car over a small period of time (represented by the slope of tangent *CT*) is just equal to the minimum cost per mile obtainable from the new car (represented by the slope of line *OQ*). And this is our general criterion for determining the economic time to turn in a used car.

Of course, many practical conditions arise which might vary the economic time — a serious accident, a long trip, and so on — and the expense curves will be irregular instead of smoothly curved as I have shown here. But by using this general method and applying the fundamental criterion of minimum cost per mile over the life of this car and the next, I believe one can determine easily and intelligently the economic time at which an old car should be turned in on a new model.

EXPLORING THE BODY WITH ATOMS

(Continued from page 355)

By changing the time of wait, we can also watch the replacement of the labeled phosphorus by new (and unlabeled) phosphorus and therefore obtain a complete picture of the flow of phosphorus into, and eventually out of, the animal's tooth. Some work has already been done on this problem at Copenhagen, and the results indicate that, three days after digestion, some of the labeled phosphorus has collected in the soft, inner part of the teeth and has spread from there clear out to the outer enamel. The importance this work will have on the understanding of tooth growth and decay can be readily imagined.

Work is in progress at Technology on the absorption of iodine by the thyroid gland. The work is being done by Dr. Saul Hertz of the Harvard Medical School and Dr. Arthur Roberts of Professor Robley D. Evans' group here. The results are very satisfactory at present, in spite of the fact that only (Concluded on page 378)

As Modern as Tomorrow

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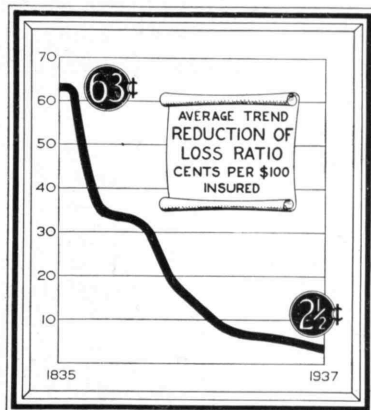
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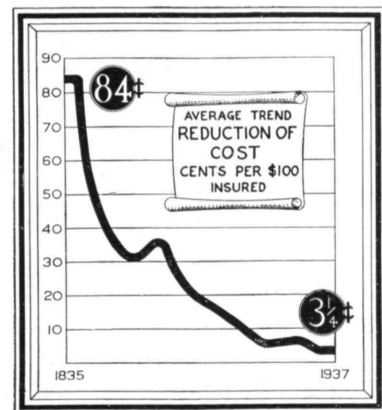
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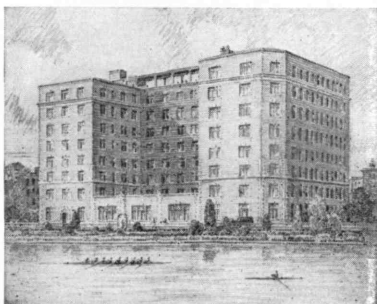
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(Concluded from page 376)

very weak samples can be made with the generators now available and also despite the fact that the radioactive isotope used has a mean life of only half an hour. The results show that the concentration of iodine by the thyroid is extremely rapid, most of the accumulation occurring within 15 minutes after injection, and that goiterous thyroids accumulate as much as ten times the iodine that normal ones do. By using a newly discovered isotope with a mean life of two weeks and by using the much stronger samples which will be available when the big electrostatic generator is in production, the measurements can be extended considerably. It seems likely that the method will be very useful for the diagnosis and treatment of goiter.

A large number of similar experiments, using different elements and studying the chemical dynamics of other organs, will be carried out here as soon as the production equipment is ready and as fast as financial aid is available. This work, here and elsewhere, should inaugurate a new era in biochemistry.

Another exciting possibility for artificially radioactive substances is to inject them in much larger doses than needed for the studies discussed above — doses large enough to affect cancerous growth, just as radium affects it. The radioactive material can be made chemically harmless (as radium cannot) as, for instance, by using radiosodium in the form of ordinary salt, and it can be injected directly into the growth (there is no use recollecting it, for its radioactivity soon dies out). A more subtle method would be to incorporate the radioactive isotope in a chemical substance which the cancer prefers, destroying the growth because of its own greediness, so to speak — which would be poetic justice indeed. A similar treatment could be used for goiter, employing radioactive iodine. However, these last methods must wait until larger quantities of radioactive isotopes are available.

Technology has a good chance to be in the forefront of this new and immensely useful field of research. The physicists and electrical engineers versed in the production and measurement of radioactive materials are already on the staff and in close cooperation on many of the aspects of the problem. Cooperation with biologists and medical research workers in near-by institutions has also been developed and can be extended when the need arises.

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THE GREAT DETECTIVE STORY

(Continued from page 359)

conditions of reflecting horizons at depth. The method is one of correlation. The factors employed are the recognition of the identity of reflections from key beds and the agreement in interval to other reflecting beds of the geologic section.

The usefulness of the refraction seismograph having been greatly exhausted, in 1930 a wave of increased activity developed with the reflection seismograph. The value of the newly perfected method was extremely great. Large companies holding millions of acres in checkerboard leases were enabled to evaluate these and to save many times the cost of exploration by the reduction in rentals. New discoveries were rapidly brought forth, particularly in the Seminole district of Oklahoma, which was peculiarly well adapted to the use of the reflection method. The limitation of the scheme to areas where correlations were possible prevented great activity in the Texas and Louisiana Gulf Coast. This handicap was removed, however, by the discovery of the dip method, wherein the attitude of one or more bedding planes could be measured at discrete locations without attempting continuous delineations thereof as in the correlation method. Improvements in the dip method have led to its widespread use in the discovery and detailing of Gulf Coast structures.

The reflection seismograph accounts for a large part of the present geophysical activity in the United States. In the year 1937 there were, on the average, at least 200 reflection crews at work each month, representing an annual expenditure of more than \$25,000,000. These crews were divided between those operated by geophysical contractors and by major oil companies who maintain their own geophysical departments. The general trend of the industry at the present time is for the companies to operate their own department crews. Competition among contractors has led to the development of improved instruments and technique. Among those prominent in the field should be mentioned the principle of the multiple seismometer connection. By employing a group of seismic-wave detectors in a series at a given point, advantage can be taken of the directional selectivity exhibited by such a group. The principle involved is that of the submarine direc- (Continued on page 382)

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Unearned Premium Reserve.....	4,694,847
All Other Reserves and Liabilities.....	1,264,978
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Cash	106,000
Cash	270,000
Cash	204,530
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Public Utility and Corporation Bonds	818,486
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THE GREAT DETECTIVE STORY

(Continued from page 380)

tion finder or of the directional selectivity exhibited by multiple shortwave antennae at spaced intervals. The method is covered by a number of patents and is in use throughout the industry. Advances in instrument design have led to the use of 12-channel recording oscillographs, amplifiers of high gain, incorporating automatic volume-control and amplitude-balancing features. Special seismometers have been developed for use in swamp-covered areas of the Gulf Coast and the Gulf of Mexico. Mobility has been a primary consideration in these designs. Special amphibian automotive equipment has also been built to negotiate these marginal areas. At the present time activity is being undertaken in the submerged lands adjacent to the coast, even beyond the three-mile limit. Title to discoveries made in the open water of the Gulf of Mexico is subject to investigation, but this situation apparently does not prevent geophysical activity in this province.

The gradual refinement of method and the increase in details of surveys in coastal areas have led to discovery that production on many domes and structures is affected, if not entirely determined, by faulting. Since the use of the dip method does not permit the direct observation of faults, many of the discoveries made in the Gulf Coast by the reflection seismograph have failed to produce oil. The successful location of a fault by any method may be said to rest upon ability of the geologist to correlate beds across the fault zone. Progress in the solution of this problem was undoubtedly retarded for many years by the prevailing opinion among Gulf Coast geologists that the sediments of this province bore insufficient points of differentiation to permit reliable correlation. The conclusion of the geophysicists in this area was that if geological correlation could not be made, certainly the geophysicist would be foolhardy to undertake it.

In 1929 under a somewhat inauspicious beginning, Conrad Schlumberger introduced into the United States the method of measuring the electrical resistivity of formations *in situ*. Variations in the measured electrical resistivity of the rock, obtained by lowering current and potential electrodes into a well filled with drilling fluid, gave remarkably significant indications of changes in the sediments. Widespread application of the method was prevented by the financial depression of 1930, but continued research developed the interesting point that not only the specific resistivity but also an index to porosity might be obtained by these measurements. The primary value of the method was the establishment of means of correlation among Gulf Coast wells.

The widespread adoption of the Schlumberger method of electrical logging has in many respects altered the general plan of exploration. There is an increasing tendency to drill exploratory or initial wells on a newly discovered prospect by the simplest and cheapest means available. The cost of these wells is greatly reduced by elimination of the need for taking frequent core samples of the formations. Without taking adequate core samples formerly, the driller could pass through formations containing commercial deposits (Continued on page 384)



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THE GREAT DETECTIVE STORY

(Continued from page 382)

of oil or gas, taking no notice of them. The use of the Schlumberger survey indicates, in most cases without question, the possibility of oil or gas accumulation in any of the formations which have been traversed. In many provinces, therefore, the simple and rapid completion of exploratory holes without the use of coring may become standard practice, depending for final analysis upon the electrical logging method. Other methods of accomplishing this result are in vogue, and competition and technical advance may develop possibilities unthought of at the present time.

The extent to which geophysicists and geologists are pressed to find petroleum in its less obvious locations is indicated by the complexity and ramifications of certain recent developments. In the field of the reflection seismograph, probably the highest degree of instrument complexity is illustrated by the method of Frank Rieber of California. Employing a multiple-recording seismograph, the Rieber method takes a variable-density sound record on 35-millimeter motion picture film. This record is obtained by means of portable field equipment. Upon development, this record is delivered to a photoelectric analyzer at headquarters, wherein the waves recorded by the sound track are transferred by a stylus recording mechanism to a long paper record. This method embodies the principle of composite recording mentioned previously in connection with the series arrangement of seismometers. The compositing agency in this case is optical, and the phase angle at which adjacent traces are combined is controlled by the angle which the optical slit on the sound film makes with the time axis. By compositing the record of all traces at various angles, this method indicates the maximum amplitude when all waves are added in phase. The attitude of the reflecting horizon can be calculated from the records.

Another geophysical means attempting to solve the difficult faulting problems of the Coastal area is exemplified by a patent — familiarly known as the electrical transient method (Eltran) — granted to L. W. Blau. By suddenly applying a current wave to two electrodes placed some distance apart on the surface of the ground, a field is generated within the rock formations. The distribution of this field depends upon the distribution of the conductivity and specific inductive capacity of the formations. If the earth were homogeneous and isotropic, the field would build up to a maximum along an exponential function which might be observed and recorded by two potential electrodes spaced at some distance outside the two current electrodes. Recording of the transient wave thus produced is made on an oscillograph. During the course of the development of these principles, it was found that discontinuities in the recorded wave might be observed under special conditions. Continued study suggested the possibility that these might be caused by abrupt changes in the continuity of earth sediments.

For thousands of years man has noted the occurrence of seeps of petroleum and gas at the surface of the earth. Investigation of many of these local deposits led to the discovery of commercial production. The extent to which this principle may be carried is exemplified by the

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present activity in making quantitative analyses of the hydrocarbon gases contained in soil. Many involved theories have been presented, but the general basis of all of them is that the soil gas content should exhibit a maximum in the vicinity of a large subterranean deposit of gas or petroleum. These theories involve the permeability to hydrocarbons of the entire geologic section overlying the deposits. Since most petroliferous sediments are capped with rock layers which effectively seal the deposits within the containing reservoir rock, the degree to which hydrocarbons escape to the surface is problematical. In some instances soil gas content has been found to be a minimum over producing fields. Escape to the surface may be accomplished by the presence of faulted zones or a system of minute vertical fissures in the sediments.

Sometimes core holes are drilled to depths of the order of a thousand feet, and samples of the formations at these depths are analyzed for gas content. These core holes are frequently subjected to electrical logging analysis in an effort to determine the presence of faults. Once the direction of throw in the fault is established by any method, the probable effect upon the distribution of production can be ascertained.

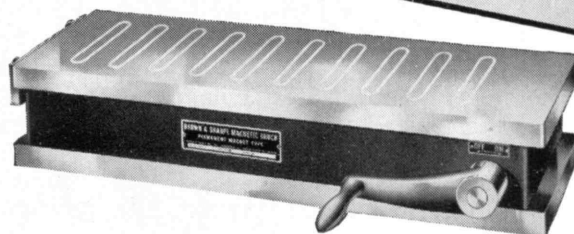
For similar purpose the use of field measurements of electrical resistivity and the potential distribution by direct current and alternating current methods offer immediate possibilities. Some activity is being undertaken along these lines. The cost of field exploration by the electrical method has been greatly reduced during the past year by the Jakosky invention of the mobile electrode. Making contact with the surface of the earth by means of a steel wheel which is attached to a motor truck, this method permits continuous recording of electrical measurements while the truck is in motion. Jakosky also reports depth penetrations to 5,500 feet, a notable advance.

Reconnaissance magnetic surveys are being continued in many areas of the Midcontinent and Mississippi Embayment province. Depending for their observations upon anomalous distribution of the earth's magnetic field, they give indications of structural features in the basement complex. Likewise they indicate the presence of igneous intrusions, many of which may have produced anticlinal structures in overlying and overlapping sediments. The presence of serpentine dykes and plugs in Southwest Texas and other areas indicates the use of the magnetometer for investigation. The existence of many faults in the Balcones zone was strikingly demonstrated through the use of this instrument. The cost of a reconnaissance survey by this method is probably as low as by any adequate geophysical procedure. Depending upon the density of distribution of the points of observation, William M. Barret reports that the cost figure may run from one-half cent to two cents per acre on a reconnaissance basis. Other geophysical methods may run as high as 25 cents an acre where detailed investigation is required.

In any given province the program of exploration is largely one of elimination. The chief geologist or other official in charge will map out an area which for some reasons indicates to him the possibility of oil accumulation. He first undertakes to (Continued on page 386)

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THE GREAT DETECTIVE STORY

(Continued from page 385)

map the surface geology, either by field parties or by aerial photography. He will have examined and interpreted all available subsurface data for clues for possible traps. At this point it might be logical to explore the geological situation further by means of core drilling. Should any of these investigations lead to favorable conclusions, some low-cost reconnaissance method of geophysical investigation might be employed, for instance the gravity method or the magnetic method. Should all indications continue favorable, the next logical step would be surveying by the reflection seismograph to obtain detailed structure data.

Upon completion of such a survey, any area which had shown consistently favorable indications would be ready for leasing. The land department of the exploring oil company, upon receipt of the proper advice, would proceed to purchase at current prices all of the available leases in the area. Of course that the entire favorable area be brought under the control of the exploring company would be highly desirable, but in the event that competition prevailed, the discoverer of the potential field would take whatever was available at a reasonable price. As development of the project advanced, favorable trading with other lease holders in the area might be carried out. Finally after all known means of exploration have been employed, the final test is the drilling of a well. Although all of the exploratory means may indicate favorable conditions, none of them has ever been able to perform directly upon the actual deposit of petroleum. The science of petroleum exploration may be said to be an evaluation of the probabilities of the occurrence of oil or gas. If the cost of acquiring acreage and drilling a well is not out of proportion to the prize at stake, the chances are that even hazy indications of an oil field will be investigated to the end.

A canvass of most of the operators of geophysical methods throughout the United States for 1937 reveals the following approximate activities: Reflection seismograph, 2,400 crew months; torsion balance, at least 420 crew months; gravimeter, 360 crew months; magnetometer, 650; electrical, aside from well-logging methods, 120; Eltran, 60 crew months. Reports for all the activities except for the reflection seismograph are confined to the southern, southwestern, and western portions of the United States. Data for other areas were not available. An estimate of the number of crews making electrical logging analyses would reach a figure of at least 25 parties.

Such is the story of how oil is found. What now of the future? Can we say that the methods as they exist today are adequate for the needs of the nation? Much speculation has been expended upon this question, and it is doubtful if a definite answer can be had. As in the case of finding a pool of oil, the answer is at best an evaluation of probabilities. Periodically, outstanding experts in discovery make predictions regarding the future reserves of the nation. Invariably these estimates have had to be revised, but the following figures prepared in 1937 by the Department of Public Relations, American Petroleum Institute, in terms of estimated reserves are

of interest: 1914 (Arnold), 6,000,000,000 barrels; 1915 (United States Geological Survey), 7,500,000,000; 1921 (American Association of Petroleum Geologists — United States Geological Survey), 9,000,000,000; 1925 (American Petroleum Institute), 5,000,000,000; 1937 (American Petroleum Institute), 13,063,000,000 barrels.

There are two methods by which an estimate of the future discovery rate might be attained. The first of these was suggested by Wallace E. Pratt in his paper presented at the annual meeting of the American Association of Petroleum Geologists in Los Angeles, Calif., in March, 1937. Mr. Pratt showed from his studies that the rate of discovery based on the number of barrels discovered annually, or upon the number of pools whose ultimate reserves were estimated at more than 20,000,000 barrels each, rose gradually from 1901 to a maximum in the five-year period 1926 to 1930, and then declined at approximately the same rate. In both instances this analysis showed that the fruitfulness of exploration efforts is not so great at the present time as it was 10 years ago. On the other hand the results of these studies showed that geophysical methods in the period 1931 to 1935 accounted for 55 per cent of all discoveries. It might be said that the utility of these methods is still on the increase and that the law of diminishing returns has not yet begun to work seriously. Gratifying it is to know that during this same period 85 per cent of the discoveries were based upon scientific programs, whereas purely random drilling accounts for but 12 per cent of the total discoveries. At the beginning of this century random drilling accounted for 30 per cent of the whole. With the exception of the great East Texas field, the amount of petroleum discovered by purely random drilling has continued to be a lesser portion of the discoveries of each succeeding year.

Another effort to evaluate future possibilities of the industry was made by Dr. Alexander Deussen, consulting petroleum geologist, at the March meeting of the American Association of Petroleum Geologists. Dr. Deussen outlined a method which is analogous to that of sampling employed in industry. Considering for his studies the prolific area of the Texas and Louisiana Gulf Coast, he gave figures showing that this area had produced more than 35 per cent of the proved reserves of the United States. Because of the high rate of success in this province, probably more detailed exploration work has been completed here than in any other province of the United States. Taking as his yardstick Harris County, Texas, Dr. Deussen calculated that this county had the greatest density of exploration and drilling of the entire Gulf Coast province. Assuming that because of the intensive work, all of the potential discoveries have been made in Harris County, Dr. Deussen's calculations showed that this average density of the distribution of producing fields, when applied to the remainder of the Gulf Coast province, would bring the number of new fields to be discovered to the astounding total of 351. This estimate is based upon the fact that in Harris County the area of the producing fields to that of the entire county is 1.6 per cent. Upon this basis the total number of fields, even at one per cent of the Gulf Coast province, should equal 516. At the present time

there are 165 producing fields in this province. The probable total recovery of these additional 351 oil fields amounts to nearly 10,000,000,000 barrels!

Although there may be tremendous oil reserves yet to be discovered, it is generally agreed that the technique of oil finding must be improved in the near future. The decline in discovery rate during the past five years demonstrates that even the best of the newly established scientific methods have failed to maintain the discovery rate of older methods. Recourse cannot be had to the older methods because they have long since entered the phase of diminishing returns. There is abundant evidence that adequate petroleum reserves can be maintained during the present generation. The cost of petroleum in the future, however, will be largely determined by the success of the exploration scientists in improving the efficiency and power of existing exploration techniques and in discovering new techniques.

THE INSTITUTE GAZETTE

(Continued from page 370)

on under the auspices of the Carnegie Institution of Washington. The meters, in the design and construction of which Professor Ralph D. Bennett of the Institute's Department of Electrical Engineering was associated with Dr. Arthur H. Compton and Dr. A. W. Simon of the University of Chicago, are an interesting combination of ruggedness and delicacy. For example, massive steel spheres and a one and a half ton shield of lead are employed in them to house argon gas, which, at a pressure of 750 pounds to the square inch, responds to the penetration of the rays in a measurable electrical way. At the same time, thin films of wax have been used to seal openings and tubes connecting the gas-inclosed mechanism with the registering and recording system—a clock-driven strip of photographic film in a camera, which records the measurements over a period of months.

Extremes of temperature, with consequent variations in pressure and different degrees of expansion or contraction in the steel, brass, wax, and other materials used in the meters, may result in leakage of the argon—an expensive loss, as well as a hindrance to efficient operation of the meters. Professor Bennett has lately been engaged in forestalling such dangers by the perfection of an amber-neoprene gasket which has proved successful in tests during which the meter was chilled to 95 degrees below zero F. by the use of carbon dioxide snow. In developing the new seal, Professor Bennett determined the coefficient of expansion of amber as 24 parts in a million for each degree of temperature. For brass, the figure is 10 parts per million, and for steel, six.

This kind of insurance against difficulties was made more necessary by the next steps planned in the radiation study. A meter will be transported this summer to the Danish meteorological station at Godhavn in Greenland, well within the Arctic Circle. In operation, it will be housed in the station, of course, but during the journey or as the result of accident, it may be subjected to thermal dangers which the amber gasket is expected to avert. Another (Continued on page 388)



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THE INSTITUTE GAZETTE

(Continued from page 387)

meter will be journeying back and forth between Seattle, Wash., and Juneau, Alaska, on one of the vessels of the Alaska Transportation Company, making a round trip each week for four months and two trips a month for the rest of the year.

The seagoing meter in its Alaskan voyaging will be extending surveys made last year, in which a meter traveled between Vancouver, British Columbia, and Sydney, Australia, on the S.S. *Aorangi*. The arctic meter at Godhavn will serve to push farther north the series of land meters already mentioned, which are distributed in a band roughly between the 80th and 100th meridians, at Huancayo, Peru; Mexico City, Mexico; Cheltenham, Md.; Chicago, Ill.; and at the Institute in Cambridge. There is, in addition, a meter stationed in the Eastern Hemisphere at Christchurch, New Zealand. The records being collected by these meters and by their nautical compeers yield data on the variation of cosmic-ray intensity with latitude and with time. Since the rays are affected by the earth's magnetic field, the study is concerned with geomagnetic rather than with the familiar geographical latitude of everyday maps. The difference between these two kinds of measurement of the earth's surface — a difference resulting from the fact that the magnetic north and south poles are some 20 degrees removed from the true geographic pole — may be visualized by thinking of a conventional globe tightly wrapped in a fish net so that the cords of the net lie on the meridians and parallels of geographic longitude and latitude. If the fish net is gathered in knots that lie at the geographic north and south poles, and the knots are pulled away from the poles an inch or two, depending on the size of the globe used, the cords of latitude will fall upon the geomagnetic divisions. Completion of the chain of meters by the Greenland installation this summer will extend the range of observation from 52 degrees south to 80 degrees north geomagnetic latitude.

Where Is North?

INVESTIGATORS in Technology's Department of Aeronautical Engineering have for some years been studying the instruments used in air navigation. Their



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purpose is to replace vague ideas about the instruments by exact knowledge and to secure quantitative estimates of how to improve the usefulness of their tools by cutting down errors in performance due to the rapidly changing conditions encountered during flight. The magnetic compass and the meter which indicates the rate at which a plane is climbing have most recently been studied for these purposes.

The method followed by the investigators — Professor Charles S. Draper, '26, William H. Cook, Jr., '35, and George V. Schliestett, '36, of the Institute and Walter McKay of Sperry Products, Inc. — has been to predict theoretically the performance to be expected from the instrument during various specific maneuvers and then to check the prediction by flight tests. During these, the plane is put through the specified paces, while a moving-picture camera watches the instruments in question, which are specially mounted for ease in observation. Data collected by the film during flight are then used to check theory. By this means it is possible to systematize knowledge concerning the operation of the instruments and to make that knowledge precise. The factors of flight which control the error of the instruments are thus indicated, with results that may well expedite future design looking to a minimization of the errors.

In studying the magnetic compass, Professor Draper and Messrs. Cook and McKay were concerned with what is known as the northerly turning error. The turning error occurs when, as the course of the plane is changed, the compass card oscillates erratically and

does not accurately indicate the relation of the course to the magnetic pole. It is most pronounced when the plane turns out of a northerly course; hence the name "northerly turning error." It is in turns, of course, that the compass is most needed; in these turns out of a northerly course, the compass in the initial instants indicates a turn in the wrong direction. In turns out of a southerly course, the compass in the first moments indicates the direction properly but greatly exaggerates the angle turned by the airplane. Analyzing the errors and studying the effects of the damping, or slowing of the motion, of the compass card by the liquid in which it is immersed, the investigators have found that deviation may be cut down by reducing the controlling force — the action between the magnets of the card and the earth's field — and increasing the mass of the moving element — the card. Further problems concerning the compass are under study.

The rate-of-climb meter is very important in blind flying as an aid to level flight and is likewise important in checking the ascent or descent of a plane with respect to steadiness and rate. The rate of change in atmospheric pressure as the plane climbs or descends is measured by means of a pressure gauge and capillary leak. It has always been vaguely known that the instrument would give an inexact reading in rapid maneuvers because the registering operation lags slightly behind the changes in pressure, so that in both phase and amplitude, error occurs. Having analyzed the error and set up a hypothesis, Professor (*Concluded on page 390*)

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THE INSTITUTE GAZETTE

(Concluded from page 389)

Draper and Mr. Schliett checked it by photography during test flights and found their theory entirely confirmed by observation. As was true with the compass, the factors controlling the error in the rate-of-climb meter are indicated by coefficients determined in the tests. Sudden application of force on the elevators of an airplane trying to hold a level course causes responses in very great error, so great that the instrument may indicate a climb when the airplane in reality is losing altitude. The error of the instrument, moreover, is found to increase with increasing rate of change of altitude. For an accurate reading with modern meters, conditions must be maintained constant for a period between six and 12 seconds.

From this study, ability to predict the behavior of the meter during flight is secured; improvement in design may be assisted as a result, although the error is probably permanent.

Air Conditioning

TO illustrate and study the fundamental principles of air conditioning, to ascertain the efficiency and capacity of various types of air-conditioning equipment, and to study their operation and control are the purposes of the Institute's air-conditioning laboratory, which is now in the process of establishment in new quarters under the direction of Professor James Holt, '19, of the Department of Mechanical Engineering.

Various types of air-conditioning equipment are installed for operation in the laboratory, which occupies two rooms, one of which — the laboratory proper — can be air conditioned by means of apparatus in the works room adjoining. One problem now under attack is the determination of moisture flow through a wall or around a window — a study of importance in connection with summer air-conditioning programs — which leads to passage of moisture through walls and window cracks because of differing vapor pressures. Two model chambers are being used in this study, the air in one being humidified, that in the other dehumidified. Quantitative measurements of the leakage into the dehumidified chamber are being secured with a view to establishing theoretical checks for empirical results. Undergraduate teaching is aided also by these results.

Coöperative work with the Department of Biology and Public Health, following the coöperative practice characteristic of all Technology research, has engaged the use of the air-conditioning laboratory in an interesting investigation of the effect of humidity, temperature, and air motion on the preservation of food in domestic refrigerators. For this work, a room resembling a butcher's refrigerator has been held at a temperature of 35 or 40 degrees F. Food cases in the room were kept at different humidities, and three different air motions were tested at each humidity. Surprising differences in the period of preservation of food in the various cases were noted.

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To the employers who have called on Technology for men, we extend our thanks and hope that their experience with the Class of 1938 will sharpen their appetites.

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CHECK LIST OF THE ACTIVITIES AND ACHIEVEMENTS OF M.I.T. ALUMNI, OFFICERS, AND STUDENTS

Honored

¶ By election to membership in the American Philosophical Society, WILLIAM D. COOLIDGE '96, FRANK B. JEWETT '03, and FREDERICK G. KEYES, Staff, in April.

¶ By election to membership in the National Academy of Sciences, WARREN K. LEWIS '05, April 25.

¶ By receiving the Silver Medal of the Architectural League of New York for their plans for the Williamsburg Inn, Williamsburg, Va., PERRY ('07), SHAW, and HEPBURN ('03), architects.

¶ By receiving one of the Franklin Medals awarded by the Franklin Institute, CHARLES A. KRAUS '08. This award was made "in recognition of his numerous and fundamental researches in chemistry and electrochemistry, particularly his valuable contributions to the knowledge of reactions in liquid ammonia, of the chemical behavior of metals, and of the properties of electrolytic solutions." Presentation was made on May 20.

¶ By receiving the honorary degree of doctor of chemistry from the Academia de Ciencias e Artes of Rio de Janeiro, Brazil, J. EARL FRAZIER '24, in April.

¶ By receiving the Barlow Memorial Prize of the Canadian Institute of Mining and Metallurgy, HENRY C. GUNNING '26, for his paper, "Cadillac-Malartic Area, Quebec."

¶ By being named a junior member of Harvard University's Society of Fellows, ROBERT B. WOODWARD '36. Dr. Woodward, who received his Ph.D. at the Institute at the age of 20, was one of five selected at this time for "their promise of notable contribution to knowledge and thought."

Promotions and Appointments

¶ ALLSTON K. THORNDIKE '07, elected town agent of Pittsfield, Maine.

¶ RIDGWAY M. GILLIS '10, promoted to the position of construction engineer, Division of Highways, at Fresno, Calif.

¶ TENNEY L. DAVIS '13, appointed to give the general lectures in organic chemistry and also an advanced course on the history of chemistry at

the summer session of Western Reserve University.

¶ JOHN THOREAU WHITMORE '18, elected president of the Boston Society of Architects in April.

¶ HOWARD S. GARDNER '30, made head of the department of chemical engineering at the University of Rochester.

¶ CHARLES H. WARREN, Former Staff, appointed master of Trumbull College at Yale University.

Titbits

¶ Chief engineer for Burnham Park (Chicago's \$30,000,000 Easter gift to its citizens) was RALPH H. BURKE '06.

¶ An organization whose objectives "will be less in specific research projects, than in better methods in all research; in increasing the value, effectiveness and the success of research everywhere," is in process of organization by the division of engineering and industrial research of the National Research Council, of which MAURICE HOLLAND '16 is director.

¶ Consultant on acoustics for the shed in which the Berkshire Symphonic Festival will be held in August (Serge Koussevitsky conducting the Boston Symphony Orchestra) is RICHARD D. FAY '17.

¶ Interesting studies and photographs regarding the work of ARTHUR LAIDLER-JONES '22, architect, of Miami, have recently been featured in southern publications.

¶ Built to an exact scale of 1:10,000 from United States Geodetic Survey maps, ARTHUR C. WATSON, Staff, has recently completed, as a hobby, a relief map of Boston Harbor and the surrounding territory.

Books and Articles

¶ By WILLIAM B. GAMBLE '93, "History of Aeronautics," a selected list of references to material in the New York Public Library. The fact that this listing covers only New York Public Library books does not limit its scope so much as might be supposed, as the collection there is a large one. Mr. Gamble is chief of the science and technical division.

¶ By FREDERIC W. LORD '93, "Selective Method of Letting Contracts." This book, privately published, is

written after "many years of study and effort in the attempt to raise the electrical construction business to the ethical level of the professions." We quote from the book: "Every time a contract is made to do a definite amount of work for a fixed sum, the contractor has made a short sale of labor and materials. He has sold for future delivery what he does not own but must buy, as best he can, while the work goes ahead. . . . Under these deplorable conditions it is of course natural for the successful bidder to wish to make up his losses by the extras on the contract. . . . It is generally conceded that it doesn't pay to have a contractor that is losing money. Delays are more apt to occur, the quality of the work suffers and disputes over extras are almost inevitable. . . . It is the spirit of the agreement that is most important. This is reflected by the reputation of the contractor, and a contractor with an unquestioned reputation may be relied on not only to carry out the letter of his contract, but to fulfill as well the spirit of his obligation. . . . Those who have had experience have come to the conclusion that this difficult problem is best solved by selecting a contractor on his reputation and letting a cost-plus contract with or without budget, according to circumstances. . . . When the contractor saves his client money it is true that his commissions go lower, but his reputation goes higher, and as a definite consequence, his business increases. . . ." Our excerpts make this book sound dogmatic and theoretical; but Mr. Lord has printed figures to substantiate his points.

¶ By CARLETON ELLIS '00, "The Chemistry of Petroleum Derivatives," Volume II, Reinhold Publishing Corporation.

¶ By FREDERICK S. BEATTIE '05, "Some Notes on Hosiery Dyeing," *American Dyestuff Reporter*, April.

¶ By MARCUS A. GROSSMANN '11, "Hardenability, as It Affects Heat Treated Parts," *Metal Progress*, April. "The author favors an exploration of the variation in Rockwell hardness, edge to center, and points out that appearance of fracture or center hardness may lead to false conclusions."

¶ By ERWIN H. SCHELL '12, "Trends in the Teaching of Management at

Winners

. . . in the National Regional Contest to Raise Funds for Recreational Facilities at the Institute

THE three weeks' competitive drive for funds ended on March 28, increasing the number of alumni subscriptions by 43.5 per cent and providing some examples of extraordinary loyalty as well as of efficient organization on the part of Technology communities.

The winning areas in the various districts were as follows:

<i>District</i>	<i>Area</i>	<i>Chairman</i>
I	Pittsburgh	FRANCIS J. CHESTERMAN '05
II	Niagara Falls	HARRY L. NOYES '90
III	Cincinnati	HENRY D. LORING '07
IV	Hartford	ARTHUR F. PEASLEE '14
V	Montana	ALBERT E. WIGGIN '07
VI	East Tennessee	THEODORE B. PARKER '11
VII	Oklahoma	WILLIAM J. SHERRY '21
VIII	Wilmington	WALTER J. BEADLE '17
IX	Akron	RAY P. DINSMORE '14
X	Vermont	BIRNEY C. BATCHELLER '86
XI	Duluth	WILLIAM C. LOUNSBURY '03

Every subscriber in each of these areas will receive a trophy stein.

To Be Honored on Alumni Day

In accordance with the terms of the contest, the chairmen of the three winning regions with the largest per capita subscription will be given a trip to Alumni Day this month, with transportation expenses paid by the Alumni Association. However, the chairman of the Wilmington area voluntarily withdrew from the competition for this award. Consequently, Messrs. RAY P. DINSMORE, BIRNEY C. BATCHELLER, and WILLIAM C. LOUNSBURY will be brought to Cambridge on Alumni Day and will be recognized at the annual dinner.

Special Awards

Steins were also awarded to chairmen of each of the regions indicated: (1) *for noteworthy increase in per capita subscription during the contest*: I, Washington, D.C., Amasa M. Holcombe '04; I, Newark, Winfield I. McNeill '17; II, Bridgeport, James Humphreys '95; II, New Hampshire, Herbert D. Swift '15; II, Harrisburg, Pa., W. M. Davidson '26; III, Indianapolis, J. Lloyd Wayne, 3d, '96; III, Toledo, H. A. Barnby '23; IV, Ithaca, N.Y., B. K. Hough, Jr., '28; V, Urbana, Ill., James G. Van Derpool '27; VI, Alabama, F. C. Weiss '13; VI, Mississippi, S. E. Moreton, Jr., '21; VI, Nashville, Donald W. Southgate '11; VII, Port Arthur, Theodore A. Mangelsdorf '26.

(2) *For large total per capita subscription*: I, Chicago, L. H. G. Bouscaren '04; I, Detroit, B. Edwin Hutchinson '09; I, New York, Alfred T. Glassett '20; II, Rochester, Leon L. McGrady '17; II, Schenectady, Walter M. Stearns '96; IV, Newburyport, Mass., William P. Lowell, Jr., '26; VI, North Carolina, Beaumert H. Whitton '33; VII, El Paso, Charles I. Auer '01.

(3) *For large per cent of Alumni subscribing*: IV, Northern New York, Erwin G. Schoeffel '23; IV, State College, Pa., John E. Nicholas '26.

Good fellows did get together in this contest, and to a larger degree than perhaps ever before Technology men met Technology men. Though the depression prevented the reaching of our final goal this year, all Technology men can feel that their effort has been generously supported and that a more cohesive Technology spirit exists as a result of the campaign.

M.I.T.," *The Journal of Engineering Education*, March.

¶ By TENNEY L. DAVIS '13 and JOHN O. McLEAN '34, "The Explosion of Chloroform with Alkali Metals," *Journal of the American Chemical Society*, March.

¶ By ROBERT C. DOREMUS '14, "Piping for Indirect Refrigeration," *Heating, Piping and Air Conditioning*, April.

¶ By JAMES A. TOBEY '15, "Some Recent Advances in Dairy Technology," *Food Research*, Volume III, Numbers 1 and 2.

¶ By JAMES A. LEE '18, "Producing Phenolic Resins at Pittsfield," *Chemical and Metallurgical Engineering*, an article on No. 1 Plastics Avenue, Pittsfield, Mass., where General Electric operates the largest molding plant in the world.

¶ By EDMUND D. AYRES '22, "A Floating Curriculum for Engineers," *The Journal of Engineering Education*, March. This paper gives the results of a two-year study at the University of Wisconsin on the question of teaching business and economics to engineers.

¶ By BERNARD E. PROCTOR '23, "The Field of the Food Technologist," *Refrigerating Engineer*, April. This article was first presented as a paper at the 33d annual meeting of the American Society of Refrigerating Engineers.

¶ By DANIEL C. SAYRE '23, "Semper Paratus," a story on the Coast Guard flying, *Aviation*, May.

¶ By E. B. HERSHBERG '29 and Louis F. Fieser, "Reduction and Hydrogenation of Methycholanthrene," *Journal of the American Chemical Society*, April.

¶ By LOMBARD SQUIRES '31 and GEOFFREY BROUGHTON '36, "The Viscosity of Oil-Water Emulsions," *The Journal of Physical Chemistry*, February.

¶ By ROBERT W. VOSE '31, "The Structure of Matter," *Science*, April 22, a review of R. Houwink's "Elasticity, Plasticity and Structure of Matter."

¶ By ROBERT C. GUNNESS '34 and JAMES G. BAKER '36, "Testing Heat Transfer Equipment," *Industrial and Engineering Chemistry*, April.

¶ By ERNST A. HAUSER, Staff, "A Contribution to the Early History of India-Rubber. François Fresneau (1703-1770)," *Rubber Chemistry and Technology*, January.

Fire Preventers

¶ From time to time The Review surveys Technology activity in special fields (see "Follow-up" in the

May issue). With the help of PERCY BUGBEE '20, we present this month the imposing roster of Technology men who are making important contributions to the safety of life and property from fire. We will welcome additions to this list in the realization that it is incomplete.

RALPH SWEETLAND '88, manager, New England Fire Insurance Exchange; EDWARD V. FRENCH '89, President, Arkwright Mutual Fire Insurance Company; GORHAM DANA '91, manager, Eastern Underwriters Inspection Bureau; HENRY A. FISKE '91, manager, inspection and service department, Grinnell Company, Inc.; HENRY O. LACOUNT '94, assistant treasurer, Associated Factory Mutual Fire Insurance Companies; FRANK W. LOVEJOY '94, sponsors committee, field engineering service, National Fire Protection Association; ALFRED P. SLOAN, JR., '95, sponsors committee, field engineering service, National Fire Protection Association; DAVID C. FENNER '98, director of public relations, Mack Trucks, Inc.; CLARENCE GOLDSMITH '98, assistant chief engineer, National Board of Fire Underwriters; ISAAC OSGOOD '00, manager, Boston Board of Fire Underwriters.

LAMMOT DU PONT '01, sponsors committee, field engineering service, National Fire Protection Association; ROGER W. WIGHT '01, superintendent of agencies, The Travelers Fire Insurance Company; GILMAN B. JOSLIN '05, Western Canada Fire Underwriters Association; ASA H. NUCKOLLS '05, chief chemical engineer, Underwriters' Laboratories, Inc.; JAMES I. BANASH '06, fire protection engineer, International Acetylene Association; FREDERICK T. MOSES '07, President, Firemen's Mutual Fire Insurance Company; EVERETT E. TURKINGTON '07, engineer, Associated Factory Mutual Fire Insurance Companies; WILLIAM D. MILNE '08, assistant manager, Eastern Underwriters Inspection Bureau; FREDERICK T. CROSSLEY '10, National Fire Insurance Company; OSWALD W. STEWART '11, manager, inspection department, Associated Factory Mutual Fire Insurance Companies; JOHN L. WILDS '11, President, Protection Mutual Fire Insurance Company; ARTHUR L. BROWN '13, chief engineer, Factory Mutual Laboratories; FRANK L. AHERN '14, fire protection engineer, National Park Service.

MARSHALL B. DALTON '15; President, Boston Manufacturers Mutual Fire Insurance Company; HOVEY T. FREEMAN '16, President, Manufacturers Mutual Fire Insurance Com-

pany; ROBERT S. MOULTON '17, technical secretary, National Fire Protection Association; PERCY BUGBEE '20, assistant managing director, National Fire Protection Association; HORATIO L. BOND '23, chief engineer, National Fire Protection Association; MALCOLM S. BLAKE '25, field engineer, National Fire Protection Association; ALLEN L. COBB '26, fire protection engineer, Eastman Kodak Company.

DEATHS

* Mentioned in class notes.

¶ FRANK LYMAN '75, April 26.

¶ FRANK G. STANTIAL '79, April 30, Secretary of his Class.

¶ FRANKLIN P. GOWING '90, April 3.

¶ WILLIAM J. ROBERTS '91, April 6.

¶ HARRY H. THORNDIKE '93, April 16. From the *Boston Evening Transcript* of April 23 we quote: "Mr. Thorndike was born in 1868 at Newport, R. I., at the summer residence of his father, George Quincy Thorndike, Boston landscape artist. His mother was Ellen Lewis Thorndike, a member of an old Philadelphia family. Educated in his youth in France, he was later graduated from Harvard with honors in 1890. He studied architecture at M.I.T. under the late Professor Despradelles and later in Paris, but gave up practice of the profession in his thirties because of an eye ailment.

"Mr. Thorndike served six years with the First Corps Cadets, M.N.G. During the World War, he enrolled in 1915 in the officers' training battalion, organized by the corps. When the United States entered the war, he was commissioned a captain. He served until 1919 on the Division Staff of the Massachusetts State Guard, as personal aide to the major general and as the secretary of the Massachusetts Military Council. He leaves a wife, the former Lucy B. Gurnee of New York, and three daughters, Mrs. Thorndike Phelps, Mrs. Charles B. Delafield of New York and Mrs. T. Truxton Hare, Jr., of Edgemont, Pa."

¶ DUANE L. BLISS, JR., '95, April 17.

¶ DAVID WILKINSON '95, June 28, 1937.

¶ FRED M. CROSBY '96, April 22.*

¶ HAROLD A. PECKHAM '96, October 14.*

¶ FRANK E. GUILD '05, March 19.

¶ DONALD M. GILES '13, April 27.

¶ CALEB C. PEIRCE '13, February 17.*

¶ WILLIAM S. FREETHY '16, April 22.

¶ LAWRENCE B. GREGORY '29, December 27 (see 1926 notes).

NEWS FROM THE CLUBS AND CLASSES

CLUB NOTES

Montana Society of the M.I.T.

Seven Montana Alumni gathered around the festive board at the Hotel Finlen in Butte on the evening of March 31, this being the first Tech dinner held in the state for a number of years. Beef-steak furnished the main action, and a stake for the \$1,650,000 drive for new gymnasium facilities furnished the main topic of conversation. William A. Kemper '04 gave a report on his activities as honorary secretary, and Frederick C. Jaccard '07 spoke on the scholarship funds that formerly were offered in this western country. — A clipping from the *Wall Street Journal* of March 28 was read, covering a grant of \$15,000 from the Alfred P. Sloan Foundation of New York to establish five graduate competitive fellowships at Technology.

Albert E. Wiggin '07 of Great Falls, our chairman, sent his regrets that he could not attend the meeting. Al is heading the drive for funds in Montana, and he sent reports showing that Montana was leading in the fifth district. (Since this was written, Wiggin has informed us that Montana won the first period drive for the fund in District 5. Hot Dog!)

We were glad to welcome Edward R. Clark, Jr. '35, Malcolm A. Porter '35, and Edward J. Riley '09 as new members. The latter was formerly one of the officers of the Spokane alumni organization, where he did very good work. After he becomes acclimated or, rather, copper saturated to his new home in Butte, we intend that he shall do a lot of good work here for M.I.T.

The undersigned made a plea for all members to donate as much as they could, as quickly as possible, to the Alumni Fund. — Montana is a large state, so it is rather difficult to get a large number of the 50 Tech Alumni, now living here, to attend a dinner. In fact the M.I.T. activities are divided into two districts, one with headquarters in Great Falls and the other in Butte. Within a radius of 100 miles of Butte there are 22 Alumni. A number who desired to come to the dinner could not make the trip, as poor road conditions resulted from heavy snowfall during the previous 24 hours.

Those in attendance were Malcolm A. Porter '35, employed with the Mayflower gold mine of the Anaconda Copper Mining Company, Whitehall; Frederick C. Jaccard '07, mechanical superintendent with the Anaconda Company; Edward R. Clark, Jr., '35, with the engineering department of the Anaconda Company; Walter R. C. Russert '18, superintendent of the Belmont copper mine of the Anaconda Company; William A. Kemper '04, Vice-President of the Miners National

Bank and the Butte Land and Investment Company; Edward J. Riley '09, manager of the Montana division of the Graybar Electric Company; and the Secretary, all of Butte. — CARL J. TRAUERMAN '07, Secretary, 25 East Broadway, Butte, Mont.

Rocky Mountain Technology Club

These notes are intended to serve as a summary of the activities of the Club from May, 1937, to April, 1938, inclusive. Meetings have been held monthly throughout the year, with the exception of the vacation months, July and August, when it is difficult to find a convenient time for them. All monthly meetings are held in Denver, Colo. The Club has no regular headquarters. However, correspondence directed to Harold O. Bosworth '02, President, The Denver Fire Clay Company, Denver, Colo., will find its way to the proper club officers.

On May 19, 1937, the annual elections were held. I. Theodore Malmstrom '29 and Alfred W. Garnell '33 succeeded Arthur L. Hill '23 and Lincoln Reid '29 as president and secretary-treasurer, respectively. At the same dinner meeting Ben K. Duffy '41 of Denver was awarded the regional scholarship. — On June 21, 1937, a dinner meeting was held at the University Club in Denver, in connection with the 100th annual meeting of the American Association for the Advancement of Science. Visiting Alumni and their wives attended the dinner and Robley D. Evans, Associate Professor of Physics, gave a short talk on the activities at the Institute during the past year.

A dinner meeting was held at the University Club on October 8 in honor of B. Alden Thresher '20 who succeeded Dr. Tryon as admissions officer. Professor Thresher was undertaking the annual pilgrimage which some Institute officer usually makes to the various secondary schools and colleges which may be interested in learning of the advantages Tech offers in the field of higher education. Professor Thresher gave a most interesting talk on future plans for the Institute, and there followed a lively discussion of the topics he mentioned. Of course, the proposed recreational and athletic building received much comment.

The usual monthly meetings have taken place during the remainder of the year with this change, namely, that the bi-monthly luncheon meetings have been abandoned in favor of one evening meeting every month. This change has worked very successfully and seems to have met with general approval. Unless the evening meeting is held as a dinner, the Club convenes at the home of one of the members who acts as host for the evening. One of the younger members — who are, in general, unable to offer places for meetings — is appointed as assistant host. The assist-

ant host is supposed to aid in the arrangements for the customary Dutch lunch. This plan has worked very satisfactorily. — ALFRED W. GARNELL '33, Secretary, United States Bureau of Reclamation, New Custom House, Denver, Colo.

M.I.T. Club of East Tennessee

The annual meeting and dinner of the Club was held at the Farragut Hotel, Knoxville, on April 22. J. C. MacKinnon '13, Registrar at M.I.T., was our guest and gave an interesting talk on affairs and course changes at Technology. He also presented to us the colored motion pictures showing the sailing activities on the Charles River Basin. The meeting concluded with an interesting talk by M. M. Bauer '22, illustrated with motion pictures taken by him in the Philippine Islands.

The meeting was presided over by President Parker '11, who called attention to the report of the Alumni Fund Campaign which showed east Tennessee as having the highest per capita contribution in the southeastern area, and the only region in the entire country with over 50 per cent of the local Alumni contributing.

After the reports of officers had been received, the following new officers were elected: President, Joseph C. Nowell, Jr., '23; Vice-President, Vancourt M. Hare '23; Treasurer, George Slover '21; and Executive Committee Member, Phifer Smith '09. The following members were present at the meeting: Joseph H. Kimball '94, Dana M. Wood '06, Bernard R. Fuller '09, Albert S. Peet '09, Theodore B. Parker '11, William P. Bealer '17, Thomas D. Lebbey, Jr., '17, Erwin Harsch '20, Oscar P. Young '20, Morris M. Bauer '22, Emil Birkenwald '23, Robert T. Colburn '23, Vancourt M. Hare '23, Joseph C. Nowell, Jr., '23, Walter K. Johnson '27, Howard P. Emerson '28, George P. Palo '28, Theodore B. Appel, Jr., '29, Hazen E. House '29, William Nixon '31, Robert Forbes '33, Raymond W. Smith '33, Joel B. Stevens, Jr., '13, and Richard E. Hickman '36. — ALBERT S. PEET '09, Secretary, Knoxville Glove Company, P.O. Box 138, Knoxville, Tenn.

M.I.T. Club of Northern New Jersey

Three hundred and eighty-seven million possible gradations of tone quality for each note of the Hammond electric organ! Over 700 secondary schools send at least one student to Tech every five years! Television with cathode-ray scanning transmitted over a frequency band of 3,000,000. Such were the high lights of the annual dinner of the Club at the Newark Athletic Club on April 7. Over 200 Alumni braved the unseasonal cold

and snow to partake of the fellowship and technological erudition served under the leadership of President Vilett '22, Vice-President Clarke '21, and Program Chairman Coleman '24.

President Vilett introduced the group of officers and committee chairmen who were seated at the speakers' table and expressed his deep appreciation for the great assistance and cooperation they had rendered during the year. The following slate of officers for 1938-1939, as drawn up by the nominating committee, was elected by acclaim. The new officers are as follows: President, Carole A. Clarke '21; Vice-President in Charge of Regional Meetings, William J. Lutz '23; Vice-President in Charge of Program, William B. Coleman '24; Vice-President in Charge of Membership, John M. Keck '23; Treasurer, John H. Wills '26; Secretary, Clayton D. Grover '22; Assistant Secretary, Freeman B. Hudson, Jr., '34; Members of the Executive Committee at Large: Alfred I. Phillips, Jr., '10, Benjamin W. Dow '09, A. Raymond Brooks '17, William J. Grady '22, D. Arthur Straight '24, August P. Munning '22, Everett W. Vilett '22, and Miles Pennybacker '23. Members of the Advisory Committee are: George W. McRae '10, Gordon G. Holbrook '10, Arthur W. Lunn '09, Frank B. Jewett '03, Allan R. Cullimore '07, James F. Maguire '17, Frank P. Montgomery '02, and Winfield I. McNeill '17.

President Vilett introduced William J. Orchard '11, toastmaster and master of ceremony, with his usual finesse and wit. Mr. Orchard expressed the appreciation of the Club to President Vilett for his splendid leadership during the past year. He expressed regret that John Cabot '75, the oldest living Alumnus in northern New Jersey, was unable to attend as guest of honor because of the inclemency of the weather. The speakers of the evening, introduced in turn by Mr. Orchard, were Ralph Wetsten '21, B. Alden Thresher '20, and Allen B. DuMont, Rensselaer Polytechnic Institute '24. Mr. Wetsten explained the electrical generation of sound by the Hammond organ, demonstrating some of the many effects which can be produced on this marvelous instrument. Wetsten is an accomplished musician, organist, and electrical engineer, with the result that his explanation and demonstration were both entertaining and lucid. The Hammond organ was loaned for the occasion by the Griffith Piano Company.

Professor Thresher gave a very clear picture of the problems that confront the Institute from the standpoint of choosing the best men from the secondary schools. He pointed out that the emphasis is on quality, and the entrance class is being limited to 600 so that the Institute facilities will not be overtaxed. He discussed the plan of cooperation with other colleges and the excellent work being done by the honorary secretaries. He was highly complimentary of the work and assistance being rendered by the Honorary Secretary and the Club in northern New Jersey.

Allen B. DuMont, President of Allen B. DuMont Laboratories, Inc., specialist in electrical and electronic development,

has had extensive experience in his field and led the Club through the intricacies of television history and development. He described and outlined by means of charts the early attempts at television embodying mechanical scanning devices and photoelectric cells, tracing the development up to the present day, when the cathode ray is used for scanning both in transmitting and receiving. Assistants from his laboratory had brought portable television equipment into the banquet hall, and we were able to see the production of images on the cathode-ray screen. Lack of commercial telecasting made it necessary to transmit a photograph, but the demonstration left those of us who are not versed in electrical matters thoroughly amazed. — CLAYTON D. GROVER '22, *Secretary*, Whitehead Metal Products Company of New York, Inc., 303 West 10th Street, New York, N.Y. FREEMAN B. HUDSON '34, *Assistant Secretary*, Colgate-Palmolive-Peet Company, 105 Hudson Street, Jersey City, N.J.

M.I.T. Club of Western Pennsylvania

The meeting of the Club on Wednesday evening, April 20, at the Pittsburgh University Club was attended by 40 members. David E. Jenkins, assistant to the president of the Carnegie-Illinois Steel Corporation, was the main speaker. He gave us a talk on rolling mills, their historical development and the effect of the modern continuous mills on the Pittsburgh district.

Erwin H. Schell '12, Head of the Department of Business and Engineering Administration at the Institute, happened to be in Pittsburgh attending a convention, so came to our dinner to give us a few words of greeting. Rufe Zimmerman '11, Vice-President of the United States Steel Corporation, was also in the city and attended the club dinner. The members of the Club of course were also interested to hear that we had won the regional contest in the M.I.T. Alumni Fund Drive, competing with 12 other districts. — JOSEPH L. THISTLE '32, *Secretary*, 535 Westover Avenue, Pittsburgh, Pa.

CLASS NOTES

1881

It has been disturbing to learn of Arthur Winslow's death on March 28, although we knew that he had trouble with his heart and was only slightly improved by treatment in Germany about two years ago. Winslow was directly descended from the Winslow of the *Mayflower* and was at one time president of the Mayflower Association. He was also governor of the Society of the Cincinnati and president of the Winslow Association of Duxbury. Our Class was very closely connected with the early pioneers. Briggs's grandfather was an Otis; Revere is a great-grandson of Paul Revere; Came, of Mayflower; Warren's ancestors settled Watertown before Boston was settled.

Cabot comes of this early Massachusetts stock; Abbott, Ames, Cutler, Stearns — about 85 per cent of the Class had connections with those history-making days.

From the Boston *Herald* of March 29 we quote concerning Winslow: "He was born in Winston-Salem, N.C., the son of Francis and Mary (Nelson) Winslow. When his father met death in the civil war, his mother took her children to Stuttgart, Germany. Mr. Winslow attended the University of Stuttgart and was graduated from the Massachusetts Institute of Technology in 1881. He became a member of the Pennsylvania geological survey and later was made Missouri state geologist. He went into private mining business and became president of the Liberty Bell Gold Mining Company and others. He maintained offices at 131 State street, and at the time of his death was president of the Boston Petroleum Company and was associated with several other concerns.

"The family came to Boston in 1903, living for many years at 18 Chestnut street and more recently in Otis place. Mr. Winslow was a member of the Somerset Club and The Country Club. He leaves his widow, the former Mary Devereaux of North Carolina; two daughters, Mrs. Robert T. S. Lowell and Miss Sarah Howard Winslow of Boston; a sister, Miss Sarah Stark Winslow; and four grandchildren. His two brothers were the late Rear Admiral Cameron McCrea Winslow, U.S.N., and the late Lt. Francis Winslow, U.S.N."

In the Boston *Evening Transcript*, April 5, we read that to his children Winslow left "the gift of life in New England and the heritage of our ancestry dating back to New England's early times." The entire estate is left in trust for his family after a few donations are made to friends, employees, and private funds. The Phillips Brooks Memorial Endowment Fund of Trinity Church, Boston, benefited to the extent of \$1,000. — FRANK E. CAME, *Secretary*, Chambly Canton, Quebec, Canada.

1883

Harvey M. Mansfield was reelected president of the Technology Club of Central Florida at a meeting held at the Yacht Club at Clearwater Beach in February. — George H. Bryant and Mrs. Bryant resided in Lake Eola Park, Orlando, Fla., during the winter, returning to Newport, R.I., in the latter part of March. — The Secretary and Mrs. Chase have spent six months — November to May — at Winter Park, Fla., and have been so much pleased with the city, the people, and the surroundings of Rollins College that they have bought property and will build at College Point on the shore of Lake Virginia, making their winter residence there.

As this year is '83's 55th anniversary — designated at the class reunion in 1933 to be the next reunion date — notice is hereby given that Horace Gale, George Underwood, and the Secretary are acting as a committee to plan suitable arrangements for the reunion. Notices are being

Plan to attend Alumni Day at M.I.T. on June 6

1883, Continued

sent to all living members of the Class. — HARVEY S. CHASE, *Secretary*, Bridge Street, South Hamilton, Mass.

1887

Lonsdale Green sends regrets for his inability to furnish any class news, also for the fact that he will be unable to come East in June for our 51st reunion. — George Otis Draper writes under date of March 10 that he is convalescing at the Roper Hospital, Charleston, S.C., but hoped to be back in California in two weeks. — Henry Hill explains his apparent indifference toward his classmates by stating that there was nothing to write about — concise, if not satisfying. As he said that he was starting for New York on the following day on a business trip. On April 28 he wrote of his return after an enjoyable visit to the metropolis. — Mrs. Freeman Crosby wrote to the *Secretary* on her return from Florida recently, where she spent a delightful six weeks in Orlando. She returned greatly refreshed by her sojourn there.

Herbert Wilcox, an ever present source of aid and comfort to a despairing and (sometimes) downhearted *Secretary*, writes that William H. Brainerd and son made him and Mrs. Wilcox a pleasant but brief call at their home in South Pasadena a few days prior to his letter. Continuing, Wilcox says: "We spent a few days in Death Valley recently. Though it is an easy day's drive from here, I had never been there before. It was very interesting, even though the mountains and deserts are old stuff to me. The flood and rains did not hurt us, though I have seen plenty of damage that was caused by them. On our way to Death Valley we drove for ten miles along a lake which is usually dry but now is a sea of coffee-colored water. The wind was blowing hard when we passed, and the water really looked quite ugly. Your account of your friend's experience in coming from Honolulu reminds me of ours in 1931. We had a bad storm for three days. One night we were sitting waiting for the entertainment to begin, when the ship gave a lurch which piled us all up against the rail at one side of the boat. The piano tipped over and came down on the bass drum. No one was hurt. On April 10 we made our annual trip to see the wild flowers. I think that this year they are the best I have seen. We drove for miles (in Kern County) through thousands of acres of flowers so thick that they made a solid mass of color, like a huge carpet. I wish you might see them. I lack ability to describe them."

William B. Blake, writing from St. Petersburg, Fla., says: "W. R. and Mrs. Thomas spent the winter here as usual. N. P. A. and Mrs. Carter, on their way farther south, called at my residence when, unfortunately, Mrs. Blake and I were not at home. Arthur R. Nickels was at Sarasota during the season. I am a permanent resident and voter here. Advantages of citizenship in Florida include freedom from the onerous taxation prevailing in some northern states, including Massachusetts, New York, and Pennsyl-

vania. Florida has no sales tax, no state income tax, and the homestead exemption law frees residence property, occupied by the owner, from city and county taxes, for operating purposes, up to an assessed value of \$5,000, but not from debt service taxes. Assessed values are so reasonable that for homes, occupied by the owner, the net effect is a tax of about one per cent on the first \$5,000 of actual value. On intangibles, bonds and stocks, the market value on January first is divided by two in the tax office, so that the owner actually pays but one dollar per thousand valuation. This city is well called the Sunshine City. We intend to remain here all summer, so I do not expect to attend our annual dinner. Those touring Florida should look out for cows on the highways in some sections, particularly at night. The cost of living on a given scale is less than in the North. Fuel costs for a winter season are only a fraction of those in New England. Automobile taxes are much less. Grapefruit and oranges are very cheap at the groves. Milk is an exception, being 17 cents a quart, delivered."

No more '87 class notes until November. With that fact in mind the *Secretary* has endeavored to contact as many men as possible in an attempt to secure a large and varied assortment of class news for midsummer perusal, and while the results of the appeal were somewhat short of expectation, he desires to express his heartfelt gratitude to the foregoing correspondents, whose friendly coöperation has made these messages to their classmates possible. — William S. Hadaway, Jr., is now living at 63 Glenorchy Road, New Rochelle, N.Y. Granville H. Parks is now using his home address, 6303 Georgia Street, Chevy Chase, Md., for a mailing address. — NATHANIEL T. VERY, *Secretary*, 15 Dearborn Street, Salem, Mass.

1888

By the unanimous vote of our 50th-Reunion committee, Marblehead, Mass., was selected as the place for our grand semicentennial celebration, and Hotel Marblehead is the hotel we will have for our exclusive use during June 3, 4, and 5. We reached this decision because Marblehead is nearer Boston and Cambridge than is Rockport or Plymouth. It is only 18 miles, or 40 minutes' drive. Also the price is the lowest — only \$5 per day for each man in a separate room with a private bath. The hotel fronts on the harbor, with rocks on the hotel property for our clambake, a fine bathing beach directly in front; change to your bathing suit in your room. The hotel has a private float at the west end of the beach, from which we will embark on a 50-foot, Diesel-powered cruiser for a trip along the shore adjacent to Marblehead Harbor on Saturday morning, directly after breakfast. The famous Tedesco Golf Club is only 10 minutes away, with reduced greens fees for us.

The food furnished will be plain and good, with plenty of all kinds of sea food and fresh vegetables. Our Grand Golden Jubilee Class Dinner will be held in the

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hotel on Saturday evening, June 4, after which two poems written by '88 men especially for the occasion will be read, and we will listen to the 30 (more or less) orators present. A group photograph will be taken just before the class dinner. Thirty-one men have promised to come, so far, as follows: Besler, Connor, Bird, Hamblert, Faxon, Merrell, Runkle, Ellis, Buttolph, Blodgett, Mead, Reynolds, Wood, Thompson, Cavanagh, Smith, Holman, Bates, Collins, Lee, Taylor, Foque, Brown, Webster, Nichols, Bridges, Towne, Faunce, Stone, Eastman, Safford, Hodgkins(?), Dearborn(?). We also expect to receive acceptances any minute from Ferguson, Horn, Blair, Cheney, Flint, Fuller, Jarecki, Moore, Neiler, Sjöström, and Williams. Don't miss the biggest time of all.

We will all meet on Friday, June 3, at the University Club, Trinity Place, Boston (cars will be provided for 33 men) and start at 9:30 A.M. via the following route: Turn right into Stuart Street, left to Clarendon, right to Beacon, left to Embankment Road, right to Nashua, cross Causeway to Portland, to Haymarket Square, to the new East Boston Tunnel, out on route C-1 to 1-A to Marblehead, where turn right at billboard marked "Hotel Marblehead" to hotel. If coming by Boston and Maine train, telephone North Station Information for times of departure for Marblehead. Come without writing or wiring. The hotel has 60 rooms, enough for all. Don't miss this chance of a lifetime! *Come on!*

Sunday, June 5, each group can decide on any one of six kinds of entertainment for all day, with dinner at midday. Some who live near by will leave to spend the night at home after supper, but all those coming from a distance can spend the night at Hotel Marblehead where a special breakfast will be served from seven to eight o'clock so as to allow ample time to reach Rogers Building in cars provided by classmates, to register for Alumni Day. Just before noon the '88 cars will leave Boylston Street for the luncheon for Alumni, their wives, and guests, in Du Pont Court at the Institute buildings in Cambridge. In the afternoon at the Class Day Exercises, we will have the pleasure of listening to our classmate William George Besler, 50th-reunion class orator.

All who can should plan to attend the grand banquet at the Hotel Statler in the evening. In order to round out a perfect celebration, for which we have been waiting 50 long years, we all should stay over to Tuesday, June 7, Commencement Day, to sit on the platform at Symphony Hall at 11 A.M., wearing caps and gowns provided for us. I nearly forgot to remind you that President and Mrs. Compton will act as host and hostess to the Class at luncheon on Alumni Day, with special table service. You should not miss this. We should turn out in large numbers all day June 6 and 7 to show our appreciation for what is being done for us as a 50-year Class. — BERTRAND R. T. COLLINS, *Secretary*, Chebeague Island, Maine.

1889

If any member of the Class wants to spend an entertaining half hour, we suggest looking up the leading article, entitled, "Southward Hol in the 'Alice,'" in the *National Geographic Magazine* for March. This was written by our classmate Henry Howard and describes a cruise among the West Indian Islands in the *Alice*, the boat which Henry himself designed and named for his wife. The article is not only entertaining but is full of useful and interesting information, particularly for those who are nautically inclined. It is profusely illustrated with photographs in color.

The address of David P. Goodrich is now Wells, Maine, and that of Lewis E. Johnson, Sayre Apartments, Bethlehem, Pa. The Secretary has learned of the following deaths but has no information: Henry Y. Gilson died at Windham Depot, N.H., August 28, 1936; Robert C. Williams, on July 12; and Carlos B. Moore, at 4 Sylvester Terrace, Wellesley Hills, Mass., on November 24. — WALTER H. KILHAM, *Secretary*, 126 Newbury Street, Boston, Mass.

1891

The sympathy of the Class is extended to Linfield Damon on the loss of his wife, who died April 6. The following is from the Boston *Evening Transcript*: "Mrs. Ida Sherman Damon, wife of J. Linfield Damon, who has been nationally known in hotel operation, died yesterday at her home, 295 Kent Street, Brookline. A direct descendant of Captain John S. Parker of Lexington, Mrs. Damon was born in Cambridge. Her parents were William H. and Ellen S. Lawrence Sherman. Her father was prominent in the woolen goods business in New England. Mrs. Damon leaves a daughter, Priscilla Sherman Damon; two sons, Sherman Damon, who married the former Christine Hopkins of Rye, N.Y., and Lawrence Barton Damon, who married the former Elizabeth Townsend Wheeler of Chestnut Hill last spring; also three grandchildren. The family spent summers at Marblehead Neck for several years."

We quote from a recent letter from Arthur Alley to George Hooper: "Yours of the eighth just received today upon my return from a 1,600-mile motor trip. The storm did very little damage down here; in fact our rainfall is not up to normal and therefore I haven't any story to tell Barney. You were very lucky to escape the damage done in other parts of Pasadena."

We received notice of the death of Arthur W. Rice of Milton, Mass., on March 25. He was in Course IV and retired sometime ago. The following is from the Boston *Globe* of March 26: "Mr. Rice was noted for the designing of some of Boston's finest buildings. Among them were the Boston Chamber of Commerce Building, United Shoe Machinery Building, R. H. Stearns, John Hancock, Boston Consolidated Gas and Boston Five Cents Savings Bank. He was born in Roxbury, the son of George W. and

Adelaide Walker Rice. He prepared at Roxbury Latin School and was graduated from M.I.T. in 1891. He was married to Martha Davis Brewer of Boston in 1911. Mr. Rice began practice in Boston and later formed the firm of Parker, Thomas & Rice. He was trustee of several well-known charitable organizations. He was a member of the Harvard, Somerset and Exchange Clubs of Boston, the Hoosic Whisick Golf Club of Canton and the Cosmos Club of Washington. He was also a fellow of the American Institute of Architects and the Boston Society of Architects. He leaves a wife, two daughters, Mrs. Kennard Woodworth of Dover and Mrs. W. T. Crocker of Tuxedo, N.Y., and a son, Arthur W. Rice, Jr."

In a recent letter from Charlie Garrison, inquiring about Barney, Charlie says: "We recently had a short trip to Carmel, going over the famous 17-mile drive on the Monterey Peninsula and 25 farther down the coast to the Big Sur — the most scenic part of the Californian coast. Then to Santa Cruz to the first stand of big trees. We are beginning to get settled weather now, and I guess our rains are nearly over. It will be a long time before all the bridges are repaired and the slides taken care of. Our last trip to Boulder Dam and the Grand Canyon was so successful that we want to try it again soon. We haven't yet seen the Grand Coulee project on the Columbia River, and we have that in mind with a possible trip to Glacier Park and Lake Louise. Bob had planned to take his family to Switzerland and motor in France and Italy. He wanted us to go with him and had reservations on the S.S. *Queen Mary* for April 27, but he had some new wells to drill and he will have to abandon a trip there. We are enjoying our Capehard phonograph and giving frequent concerts."

In a later letter to Barney, Charlie said: "Wednesday we start on a short trip with my sister and M's sister. We go to Death Valley (for the first time) and you can think of us standing on 'Dante's View,' 5,160 feet, and looking right down at the lowest point of the United States, 280 feet below sea level. Then raising our eyes we see Mount Whitney, the highest point in the United States, 14,496 feet. Two nights at Furnace Creek Ranch will give us time to see the sights and then we leave for Boulder Dam, Democrat, or Hoover Dam, Republican. This time we will stay in Boulder City and explore the dam thoroughly; the last time we did not penetrate the interior. The following day we cross the dam and are then in Arizona where we run southeast for 78 miles, joining the Santa Fe Trail at Kingman. We spend the night at Barstow, 222 miles to the west, having crossed the Colorado River again at Topock near Needles, one of the hottest places in California. From Barstow we will return to Santa Barbara via Mojave, Castaic Junction, and Ventura. The weather seems quite settled now, and the closed roads are being repaired and the broken bridges replaced."

Charlie and Bert Kimball sent a number of newspaper clippings about the flood which did so much damage in southern

California. Bert Kimball also wrote about the flood: "Outside of a soaking rain for a couple of days, nothing happened here. Redondo is located on a shelflike formation, sloping slightly toward the Pacific, and the surface water poured peacefully into the sea. Inland, many little shacks, housing people, were washed away as rivers overflowed. Much general damage was done. There is much suffering in many areas, and lots of people had a most uncomfortable time. The worst feature is the loss of life. Perhaps you have not seen some of the inclosed pictures taken from the newspapers. The government has in mind a flood-control project, and the recent disaster may hurry along its construction."

We quote from a letter from George Hooper, received early last March: "January was a month of beautiful weather, the skies being clear and the thermometer going above 80 degrees F. each day. These conditions advanced vegetation far beyond its normal growth, and we have had our spring flowers about a month ahead of time. In our own garden we have had snapdragon, five feet and more tall in the last week of January, and the Japanese cherry trees have nearly all blossomed and 'gone by.' We are yet below average on rainfall, but this is no longer a matter of concern as in our largest reservoir, completed two years ago (about), we have two years' supply, while our ground reservoirs and smaller dam are gradually filling. The city also has an interest in the so-called Metropolitan Water District which will, within a few years, bring water here from the Colorado River. Apparently we are assured of water for a couple of decades."

"(Later.) It is somewhat of a coincidence that just after I had written about our then small rainfall we should be treated to a deluge, as you have doubtless seen by the papers. For about two days and nights it rained continuously and heavily, with fitful showers which have not yet come to an end. The records show it to have been the heaviest storm in about 50 years, and great damage was done even in this country which has, in the last 10 or 12 years, spent nearly 25,000,000 dollars on flood protection. The damage in Pasadena was slight except in the Arroyo, in which the flood waters soon overflowed their channel and destroyed roads and bridges and washed away more than half of the public golf course. The Rose Bowl was saved but only by chance, the water which was rapidly working toward it being diverted by brush and wreckage which lodged against a wire fence and formed sufficient obstruction to send the stream around the structure. There was a considerable depth of water inside the bowl, this having backed in through drains, but as this was not in motion and did not rise above the lower concrete portions, it did little damage. All mountain resorts were destroyed, with some loss of life and with considerable privation and suffering to survivors. All dams held, so that no damage occurred from that cause. Railroads, highways, and bridges were seriously washed away, so

Plan to attend Alumni Day at M.I.T. on June 6

1891 Continued

that we were isolated and received no outside mails for several days. Even yet some of the railroads are sending their passengers over 50 miles by busses to points from which train service can be operated.

"Orange County, which adjoins Los Angeles County on the south and east, suffered severely, no flood control program having yet been adopted there. The Santa Ana River, its principal stream, did extensive damage in the cities of Riverside, Anaheim, Santa Ana, and so on, leaving its bed in numerous places and in one place entirely changing its course. Disposing of a heavy rain is a serious matter out here, as the mountains, which average over 4,000 feet high, are but about 30 to 40 miles from the sea, and the latter five miles or more of the river bed are very flat. In fact, the flood control channels of several of the streams in this country are higher than the surrounding terrain to minimize tide effects. I think that we shall have to put the correction of all of these difficulties into Roosevelt's hands. He thinks that he can control the dust storms of the Middle West; why not the water storms of these areas? So far as I can learn, none of our classmates in this vicinity has been in any damaged area, but I have written all of them asking them to write their story to you if they have one.

"I am glad to say that we are all very well and much occupied with preparations for the wedding of our youngest daughter, which comes early in April. The deluge matter has driven other thoughts out of my head. I should have spoken of attending a Tech dinner given some weeks ago for Dean Bush '16, who was here in consultation with the designers of the 200-inch telescope. It appears that considerable trouble is yet experienced in keeping an accurate focus on any moving body in the heavens which it is desired to photograph, so that his knowledge of, and experience with, calculating machinery of great intricacy and accuracy are enlisted. The dinner was very pleasant, and Bush spoke very well. Francis Viele came up, and we met after a separation of 30 years to a day. As I have said before, our Class is about the oldest represented at these dinners, although there was one '90 man present at this one. Everyone is much saddened by the death of Dr. Hale '90, who had been failing rapidly for about a year, spending the last few months at a sanitarium. He was always approachable and most agreeable."

Harry and Mrs. Young and Steve Bowen spent several weeks this winter at the British Colonial Hotel in Nassau. They report a perfect climate, swimming and sun-bathing every day. All seem to agree that Nassau is "weather perfect." — Howard and Mrs. Forbes have been in Florida — Winter Park, I believe — but I haven't heard from them. — Will Wilder's mother died recently; she was over 90 years old.

The writer took a short boat trip to Havana and Nassau about April 1. It was calm all the way; warm and sunny except

the last day. Swimming and sun-bathing as ordered. Went to the country club in Havana but didn't play golf. Had played there years ago with Cubans for partners or opponents, and it is a fine course. It seemed odd not to see Charlie Ricker, who lived there many years but is now in Cleveland.

We hope to arrange for a class outing or dinner shortly, perhaps just before Alumni Day. — There are the following changes in address: Sterling Dow's mail is now being sent to 216 Vaughan Street, Portland, Maine. — We have had notice that Ludwig M. Weiller, who was listed in our records as "no address," is located at 25 Central Park West, New York City. — Paul W. England is now residing at 2444 Great Highway, San Francisco, Calif. — HENRY A. FISKE, *Secretary*, Grinnell Company, Inc., 260 West Exchange Street, Providence, R.I. BARNARD CAPEN, *Assistant Secretary*, Early Convalescent Home, Cohasset, Mass.

1896

Presumably the report of the Alumni Fund Campaign will be issued later, either through the channels of The Review or otherwise, but classmates will certainly be interested to learn class results on the date that these notes are being dictated, April 25. The membership list of the Class numbers 284, including graduates and nongraduates. The number of classmates who have subscribed is 72, or 25.35 per cent of the total number. Compared to other Classes, '96 has done well, standing in fifth place in percentage of subscribers, and the four Classes which have done better are mainly older Classes, very small in numbers, who are closely knit together and have responded well. It will be understood that where an old Class may have only four or five members still living, it is easy for that Class to secure a good percentage of subscribers. In fact two old Classes reached 100 per cent, and the third class in order now stands at 29.3 per cent, which is only a short distance above '96. The total amount of pledges for '96 is \$12,002, and the Class stands third in the amount of its total pledges. The average subscription per capita based on the entire class list was \$42.25. The average of the 72 subscriptions actually received was \$166.70. Your Secretaries have reason to feel proud of the way that classmates have responded, especially in view of the fact that a separate class organization for individual personal contact was not set up, and the responses are thus largely the result of the general mailing campaign, supplemented by the class mailing and individual letters by the Secretaries.

Classmates will learn with much regret of the deaths of two classmates, Harold A. Peckham, who passed away on October 14, and Fred M. Crosby, who died April 22. Further details will be given in the next issue.

Some men do things in a quiet way, so that the world does not always appreciate their accomplishments. The Secretary has recently received, through an outside channel, an account of such a

man, and the following excerpts have been taken from this account, with the thought that they will be interesting to classmates: "Russell W. Porter studied at M.I.T., and at the same time participated in arctic exploration. Mr. Porter went back to M.I.T. as an instructor, then spent a year at Washington, D.C., studying optics, and came back to his home town, Springfield, Vt., to perfect Mr. Hartness' comparator, a machine to test screw threads. Mr. Porter interested the men in grinding lenses and making telescopes, and the Amateur Telescope Society of America is the result. Incidentally Mr. Porter patented a ball-bearing mount for telescopes, and when Cal Tech astronomers began the quest for the 200 inch, they invited our friend Mr. Porter to Pasadena to work with them. It has proved a very fortunate move for everyone, for it has been said they have never brought him a problem which he could not solve.

"You know how Los Angeles has been given the wonderful planetarium. When the Cal Tech astronomers came home from the first conferences, one of them said to Mr. Porter, 'What is your idea of a plan for that?' He took up his pencil and rapidly sketched his idea, and the astronomers saw to it he was put on the planning board. By the greatest bit of good luck in the city architect's office was a classmate of Mr. Porter's, and these two men worked eye to eye, so in spite of much opposition the planetarium is practically Mr. Porter's plan. He has never received the credit for his work until now. The mounting for the 200-inch telescope is his work and will be a memorial to him. Mr. Porter told us that some of the work he did in strains and stresses when he was engaged on Professor Despradelle's Tower (of Babel we called it) he had used in working on this telescope mounting."

Through the kindness of Harry Tozier, the titles for the movies taken at our last reunion have been printed, and when the Secretary saw Henry Jackson, the latter part of April, Jackson said that these titles would be put into the movies very shortly, and the reels would then be available for showing. — A letter from Charlie Lawrence in New York tells of meeting John Tilley one day, and also about Lawrence's travels in the West. In making a call on a firm in Detroit he had a little difficulty in getting by the lady at the information desk and received assistance through a courteous young man of the staff in the same office. This courteous young man happened to mention that his name was Morse, and it developed curiously enough that he was the son of our Lou Morse of the York Ice Machinery Corporation in York, Pa., and Lawrence and young Morse had a pleasant time reminiscing.

Dr. Waterhouse, who is on the metallurgical staff of M.I.T. and who is also president of the American Society for Metals, reports that in attending the convention in Los Angeles during the latter part of March he found that Bradley Stoughton was also present. — Frank Gardner '38, who has been the recipient of the '96 class scholarship, is the son of

our classmate Henry Gardner and is due to graduate this month. He has made a very fine record at the Institute. — The Secretary has had the pleasure of correspondence and a personal call from Mrs. F. W. Lee, who was Marion Lewis in our school days. Mrs. Lee's son Francis is now in Stanford University but may decide to change over to M.I.T. to complete his studies in mining engineering, and thus he may become an applicant for the scholarship.

Rockwell and Mrs. Rockwell returned from their southern trip early in April. They saw Stanley Howland in Asheville, N.C., and found him in very poor health from heart trouble and other ailments. Stanley has two married daughters and also a son who has just been graduated from Annapolis. Rockwell did not contact Billy Clifford, but he had word from Billy that Billy's wife was pestering him for a new kitchen with all of the modern equipment. Billy Anderson and Mrs. Anderson were in town again in April, and a very pleasant day occurred on April 21, when Billy, Fred Damon, and Rockwell played a round of golf in the afternoon, and then, with the Secretary, assembled at Rockwell's house, with Mrs. Rockwell as hostess, for an informal dinner. The evening passed all too quickly, and every minute was thoroughly enjoyed. — CHARLES E. LOCKE, Secretary, Room 8-109, M.I.T., Cambridge, Mass. JOHN A. ROCKWELL, Assistant Secretary, 24 Garden Street, Cambridge, Mass.

1900

At the exhibition of the Boston Society of Landscape Architects held March 13, one of the prizes was awarded to Henry V. Hubbard of Olmsted Brothers, Brookline. — From the family of Mrs. Lawrence R. Brooks, Rio Grande City, Texas, has come word of her death on February 12. Mrs. Brooks was Ethel Fifield, IV. — Notice has just been received of the death of Charles Van Merrick, IV, on May 1, 1936, at Oracle, Ariz.

Brock sends best wishes and greetings to all the classmates in his letter inclosing a check for the Alumni Fund. — E. G. Allen has been a very busy bee during the Alumni Fund drive; nevertheless he took out time to report the appearance of a new granddaughter. — President Dalton '15 of the Alumni Association nominated Allen, as chairman, with Russell and the Secretary to serve as a committee on resolutions on the late Ingersoll Bowditch. The report was written into the records of the Alumni Council at its meeting on March 28 and a copy sent to Mrs. Bowditch. — What a wheezy model T said to a great big Buick with a chauffeur was not recorded as they drew up alongside, but the Secretary was mighty glad to see one Wastcoat on the Cape road the other day. The ladies got chatty, but Dick was a bit bored to be seen in such company.

By the time you get this, reunion will be on us, and you will be thinking of Alumni Day. Now, as you will remember, there is always a brief period when you shift from one foot to the other. As a

diversion, or speaking of elbows, while it is admitted that the angle of incision is equal to the angle of refraction and lies in the same plane, bear in mind that a small liquid weight in the hand would change this quite materially. This can be arranged; see the Secretary. — C. BURTON COTTING, Secretary, 111 Devonshire Street, Boston, Mass.

1901

Registration: 8:30 A.M. to 10 A.M., June 6, Rogers Building! That sounds familiar, and the final giving up of Rogers Building will be further celebrated by special exercises and a most interesting symposium on "The Impact of Science on the Arts." Tech on Boylston Street will thereafter be only a fond recollection; so every 1901 man within hailing distance should be present in order to commemorate the occasion properly and later on to celebrate the other Alumni Day exercises at Cambridge. As usual there will be a delicious alfresco luncheon in Du Pont Court, to which wives and sweethearts are invited, and the ladies are also most welcome at all of the other festivities and even during the evening may sit in the balcony and watch the gastronomic manipulations of their husbands and boy friends during the dinner at the Hotel Statler. As usual, class members will be seated together, and there would seem to be no good reason why 1901 should not send in sufficient reservations to require several tables. There will still be time to make reservations after the June Review is received. Willard Dow and I will anticipate the pleasure of seeing a lot of "Naughty Oners" at that time. We may also note that the entertainment after the dinner is to be something sensationally different; so if business will not possibly allow attendance earlier on Alumni Day, don't miss the dinner.

June 7 will be Commencement Day, and it is possible that certain proud fathers of the Class, who raised their families on a somewhat deferred plan and have sons or daughters graduating this year, will be in attendance as well as any other '01 men whose business interests will allow them to be present. Within less than ten miles of the old Rogers Building on Boylston Street there are now located more than 40 1901 men; so even if it does not prove feasible or convenient to hold any other regular class meetings between the five-year anniversary reunions, we should be able to make a good showing each year at the Alumni Day banquets.

Since the last issue of *The Review* the Alumni Office has advised of one change of address, that of Roy H. Bolster, VI, who is now located at South Laguna, Calif. Class data sheets without special comments have also been received from Farnum Dorsey, II, and Matthew Cushing, IX. We therefore judge that Dorsey is still very busy as an attorney at law in the trade-mark and patent department of the Socony-Vacuum Oil Company, Inc., at 26 Broadway, New York City. Farnum must have many interesting experiences in connection therewith, and it is just too bad that he, as well as many others of

the Class who have interesting business experiences, cannot provide some very entertaining reading for these notes by making an occasional reference to their experiences. Mat Cushing very briefly mentions on his data sheet that his occupation is "cattle raising," and as the last Alumni Register gave his address as Cushing Ranch, Saratoga, Wyo., we do not see why he, also, should not be able to spin a very interesting yarn or two (it won't even be necessary that it be all true, providing the background and details are in keeping) for the special delectation of his old friends. Even politics should not be taboo for these notes, inasmuch as a number of the fellows are importantly or otherwise connected with national affairs. — ROGER W. WIGHT, Secretary, Care of The Travelers Fire Insurance Company, Hartford, Conn. WILLARD W. DOW, C.P.A., Assistant Secretary, 20 Beacon Street, Boston, Mass.

1902

Your Secretary has received the following letter from Dan Patch, Pearl Harbor, Territory of Hawaii: "As I told you some time ago, I expected to be sent out to Honolulu, and my expectations were realized. I had a most interesting trip out, stopping at Chattanooga to see a bit of the T.V.A. development that is so much in the limelight these days. Erwin Harsch '20, formerly with our Tuttle outfit, arranged a dinner at his home, which was a delightful affair and permitted me to renew acquaintances with others of our former associates, who came in from Murphy, N.C., and Guntersville, Ala. It is such friendliness that makes my knock-about life bearable. At New Orleans I spent a grand day with the fellow I roomed with 35 years ago when I was with the Newport News Shipbuilding and Dry Dock Company.

"I had to stop off at Houston, Texas, to contact some Southern Pacific railroad folks, and while there met another of our former Tuttle Company employees who took me out to see the paper mill we recently built for the Champion Paper and Fibre Company at Pasadena. I laid off over Sunday and visited the Carlsbad Caverns. One of our other Tuttle Company men had told me it would be a shame not to see it when I was passing so near, and I agree with him, now that I have seen this wonderful bit of underground beauty and great geological time-piece. I was particularly struck with the personality of the rangers who had charge of the party, which even in this off season contained over 300 people.

"I had to wait several hours when I got back to Clovis for the westbound train on the Santa Fe and so walked out to some corrals I had seen as the train from Carlsbad neared the city. The sheep and cattle were here being fattened for marketing. I saw two interesting things here. At one place they had a dead steer pinned down and were stripping the hide. In the old days I imagine a cowboy with his pony would be on the working end of the stripping rope, but here the romance of the operation was spoiled by having it

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attached to the rear of a truck. In one of the corrals I heard a sound like a screen at a gravel plant and on seeking the source found a metal tank, a bit larger perhaps than a hot-water tank such as sits in my kitchen, with a pipe through the center. The pipe ran through loops in chains hanging from the shed timbers overhead. Steers would walk under this tank, and it would lift and roll along their backs. I located one of the feeding gang and asked him the answer. He said it was to kill bugs partly, but principally to flatten the steers' backs and round them out. I looked a bit doubting, and he said, 'Hain't you ever heard of women rollin' their backs?'

'A nephew of mine, who is in the Geological Survey and located at Camp Verde, Ariz., met me at Williams, and we spent a pleasant day at the Grand Canyon, a grand place, like the Carlsbad Caverns, for one to lose any egotistical tendencies he may have. Here again I was pleased with the caliber of the men in our National Park Service. We had good weather through the day, but as night came on, it started to snow. My next stop was for a few days at Los Angeles, where I saw Ken Grant of our Class, whose firm has a contract for the erection of a new laboratory for a concern in one of the suburbs. I had a pleasant visit with him. I also saw F. K. Baxter '01, who is a specialist on oil property valuation with the Internal Revenue. I tried to contact Walter Sohler '03 and E. S. Foljambe '01, but both were out when I called.

'My boat was held up for some 12 hours at Wilmington on account of the fog. This got me into Honolulu a day late, on the morning of Friday, January 28. The experience of arriving at Honolulu or one of the other Hawaiian ports is unique on account of the custom of decorating friends with *leis* . My brother, E. L. Patch, Commander, United States Navy, Construction Corps, M.I.T. '10 and '16, with some friends, was on hand to greet me. I did not know that a tug had brought folks aboard and was looking over the rail when a voice behind me called, 'Paging C. E. Patch.' When I turned, my brother lassoeed me with a *lei* . Before I was through with it, I felt as if I had a horse collar on. Mr. Walter Dillingham, who apparently saw it was a new experience for me, cheered me up by saying, 'Don't feel as if you were a sissy. It's just one of our customs.'

'To recount all that has befallen me since I landed would take a little book. My work has enlarged in scope, and I have been kept here longer than I anticipated, and my March 12 return sailing date has been moved on to April 16 and may have to be pushed along still further. My work has taken me into many parts of Oahu, and my brother has extended my knowledge of the island on weekends.

'On Washington's Birthday I took advantage of an excursion to Kauai, the Garden Island, and with my nephew as a traveling companion, visited that charming spot.

'H. R. Philbrick '06 of Hartford, Conn., visited Honolulu, and two of his M.I.T. classmates arranged a luncheon at which T. A. Jaggar of the Kilauea Volcanic Station [formerly of our Geology Department] and 13 M.I.T. men greeted Philbrick and each other. I did not get a complete identification of all present, though I got all the last names correct I think. They were: H. R. Philbrick '06, William C. Furer '06, Sidney T. Carr '06, Johnson, E. M. Pickop '19, Belcher, H. P. Field '21, B. E. Manseau '27, E. L. Patch '10, D. W. Smith '28, C. W. Dickey '94, C. C. T. Loo '29, Dr. Jaggar, and yours truly.

'As I told you fellows at the 35th, if ever my autobiography should be written, the title would be 'The Tale of a Lucky Dog as Told by the Wag.' My good fortune followed me here, for last weekend Mr. Dillingham detailed Mr. George Denison, than whom there could hardly be a better guide, to take me to Hawaii and Maui. I had a wonderful trip but time will not allow me to tell you of it now. I have taken close to 400 pictures since I left home, an awful bit of extravagance for a Scotchman, and if the exchequer will allow it, before '02 has another reunion I shall have lantern slides made so I may share my fortune with the rest of you.

'On Maui, Arnold Kruse '36 showed Mr. Denison and me over the sugar mill, where he works in the chemical laboratory. I also met Harry Baldwin '95, who is one of the best-known men in the islands. On Hawaii we were shown through the Canex plant, where a good grade of building and insulating board is made from the surplus bagasse from the sugar mills. The superintendent, who took us over the plant, is W. F. Goldsmith, who was formerly with A. D. Little and said he had known Hervey Skinner '99 and wanted me to remember him to Hervey. They do one thing to their product that we New Englanders may have to do to all our lumber one of these days, namely, termite proof it. At Maui I saw a fine new sanitarium being built from the design of C. W. Dickey '94.

'These islands seem to have been made industrially by irrigation, and there are some fine pumping stations about. The pineapple canning industry has been superposed on the sugar industry. The Aiea plantation is the only one that refines sugar, and quite a proportion of its product goes to the mainland in the pineapple cans. Oahu is a great naval and military base and is dotted with forts and barracks, Pearl Harbor and Schofield being the two largest. I went up to Schofield to see the farewell review in honor of General Moses, who was leaving. I thought I had become pacific enough so that I could observe the review without emotion, but when the 'caissons went rolling along,' I'll be doggoned if my spine didn't tingle. It's too bad the world can't grow up and quit the blood-spilling business. There were a couple of soldiers walking down the street here a short time ago, according to hearsay, and they passed a mission sign reading, 'Jesus is

coming soon.' They had been attending something besides a mission and one said to the other, 'O hell, I suppose that means another review.' War maneuvers are on now, and it has rained all day, which will make maneuvers as popular as reviews."

Montgomery, as class treasurer, is still gunning for dues. If you have not paid, he will be glad to hear from you. — BURTON G. PHILBRICK, *Secretary*, 246 Stuart Street, Boston, Mass.

1903

The Alumni Campaign for funds for a new recreational center at Cambridge has brought your Secretaries into contact with several members of the Class. In Boston, Myron Clark as well as Atwood and Sears have given us a hand in personally reaching several. MacGregor made a call in answer to cards sent him in Maine. He reports that F. Z. Brown died several years ago. We had received no note of this before. We had very welcome letters from Simpson in Berkeley, Calif., and Lee in Tacoma, Wash. They both brought back recollections of the "old days."

Lee writes: "Your mentioning the old gymnasium on Exeter Street brought to mind pleasant memories of serving on our class football team and on the Tech basketball team, the freshman and sophomore cane rushes, and other recreational events. It is interesting to think back and relive some of those occasions. I have not been in Boston since leaving there in 1903 and would no doubt find many changes now. I should like to see the new Tech buildings and observe the progress over the years. I have not been back East since coming to the state of Washington in 1908." From Simpson: "Recreation and athletics in our time were so scattered around that nobody knew anybody, so to speak. Gym was down the hole between the railroad and the Lenox Hotel; football on most any vacant lot, where the owner didn't object; while hockey — that was my line — required a long trip to Jamaica Pond after our Garrison Street rink began to leak." To the date of these notes 59 members of the Class have subscribed \$4,124. Additional subscriptions keep coming in. Have you sent yours?

The Class celebrates its 35th anniversary this year, and a committee consisting of George Greene, Aldrich, and the Secretaries has already met, discussed details, tentatively set a date of June 4 and 5 at Coonamessett Inn at Falmouth, and sent out a general letter to the Class. If you haven't answered it by the time you read these notes, it will be too late to give advice but not too late to wire your reservation. A ladies' committee has been formed and is prepared to care for the comfort and pleasure of all ladies who attend.

On the 25th anniversary about 40 members and wives attended the reunion. There should be more this year, based on the fact that as we get older, we take more interest in things of the past. This year there is an added point of interest for us who lived largely in old Rogers Build-

1903 Continued

ing on Boylston Street. That building, the last of the old group to be occupied by the Institute, is this year to be vacated, and farewells will be said on June 6. Make a special effort, then, this year to take in the whole week-end of June 4 to 6, at the Cape and in Boston. Last minute reservations should be wired to the Secretaries. — FREDERIC A. EUSTIS, *Secretary*, 131 State Street, Boston, Mass. JAMES A. CUSHMAN, *Assistant Secretary*, 441 Stuart Street, Boston, Mass.

1905

There will be only a few days from the time you read these notes until our Old Lyme week-end reunion. Better send in your reservation today. Remember: Boxwood, Lyme, Conn., June 3 to 5; fellowship with 25 to 30 classmates; golf, tennis, archery, yachting, wonderful grounds, scenery; all for \$10 for the two days. P.S. Bill Ball has accepted full responsibility for the Course in Hydraulics. Nuf ced.

One of our Assistant Secretaries has suggested as a theme song for this reunion: "Save Rogers." In interviewing the Assistant Secretary on his "Save Rogers" plan, he quotes Sid as follows: "It seems a pity to lose Rogers Building with all it means to the older Alumni. The cost of taking it down and erecting it in Tech's back yard fronting on Main Street would not be prohibitive, as the insurance company which has purchased the property would undoubtedly be glad to get rid of it. There is a parallel in the reconstruction of Chapin Hall at Williams College. An imposing hall of large capacity could be constructed at the present first-floor level with possibility of a balcony at the second-floor level, which would extend from the position of the present stairways through to the Newbury Street side. The coming reunion at Old Lyme will afford us a grand opportunity to make plans to 'save Rogers.' It is a project worthy of '05 in every way. The sentimental value of always being able to sit on Rogers steps would bring Alumni back to Alumni Day in larger numbers than ever."

Here, therefore, is our main subject for our Saturday night fireside talk. At the time of writing, these reservations have been received: Kriegsman, Bennett, Davis, Robbe, Strickland, Shapira, Ball, and Bell. Probable attendants: Motter, Marcy, Kenway, Hadley, McLean, Danforth, Buff, Young, Fisher, Chet Shaw, Barlow, and Amberg. Gene Kriegsman is heading up the New York, New Jersey, and Philadelphia delegation and will look after transportation arrangements. Ray Bell writes that *The Yankee* will be available not only at Old Lyme but for transportation across Long Island Sound on Friday for anyone able to make by Thursday night or Friday night the port of embarkation, Southport, Long Island. Write or telephone Gene at Hotel St. George, Brooklyn, N.Y., or Bell at 205 East 42d Street, New York City.

Two very regular regulars will be unable to attend this year as Charlie Boggs is to deliver two papers on "Rubber" in

London on May 25 and Dave Bridges is to be in Europe at the time. Six members of the 1938 reunion committee met with the Secretary and Assistant Secretary in the Silver Room at Walker Memorial on April 14 for a discussion of plans. Present were Shapira, Ball, Buff, Curtis, McLean, Strickland, Chet Shaw, and Goldthwait.

Frank Webster, II, a member of the '05 relay team and of the varsity basketball team, writes from Chicago, where he conducts a merchandising warehouse. Frank reports that he has no children, that he is a member of several Masonic bodies including the Shrine, and is also a member of the Chicago Athletic Club, where he enjoys golf, bowling, badminton, and tennis. He regrets his inability to join the boys at Old Lyme, particularly as his ancestors lived there in 1668. Now we know "how come" that Indian in him, or perhaps it's reverse English he infers. — Mitchell Mackie just can't keep out of this grandchildren contest. He insists that his four grandsons and two granddaughters entitle him to eminence, not realizing that Carl Graesser's claim is based on quality rather than quantity. Mitch puts in a claim for the class twins, however, boys born on October 17, 1913. Anyone wish to challenge this claim? Mackie, commenting on Grove Marcy's claim as a farmer, says: "Tell Grove that as I have a farm stocked with Shropshire sheep, I have neglected apple trees, wood lots, and so on, and could use a good farm hand right now." Herbert W. Kenway, 2d, arrived on November 12, making Hub a grandfather. The proud father is associated with Hub in his patent law practice. Through Hub we learn that Bill Green is now located at El Semil, Villalba, Puerto Rico. He is operating the foreign manufacturing business of the Daniel Hays (glove) Company, and announces to the 1938 Old Lyme convention that he is not eligible for nomination for president this year. Ray Bell insists that this does not constitute either ineligibility or immunity and that he proposes to second the nomination profusely in June.

Norman Shapira '41, none other than Sam's son, has already attained prominence among his classmates. He was on the freshman dance committee, is a director of the 5.15 (commuters) Club, and probably by now is Class Secretary. (The "probably" is Sam's estimate of his No. 1 son's vote-getting ability). — Bob Morse, II, writes from Washington (address, Munsey Building, Washington, D.C.) that after more than 20 years with one firm, including ten years as senior member, he has withdrawn and is now practicing patent law for himself. — Frank S. Elliott writes from St. Louis, where he is sales manager for the Skinner and Kennedy Stationery Company, that during the first week of June he has an assignment in California, but wishes to be remembered to "all the gang." A grasshopper on Frank's stationery seems appropriately indicative of his job. — Robert C. Bisbee, V, died at his home in Rumford, Maine, on November 7. Bisbee, after several years in the sugar and gas

industries, went to the Oxford Paper Company in Rumford, Maine, and was chief chemist there at the time of his death.

If you enjoyed reading Grafton Perkins' story of meeting an old '05 man, Hudson Jelliff, in the last issue, please pardon your Secretary's neglect in leaving out Grafton's postscript. Here it is one month late: "By the way, Fred, do you remember old Jelliff? If you do, you've even a better imagination than I have, for I never heard of him in my life — just had to think up something wherewith to eke out my scanty budget of real news. And boy, how that Jelliff guy can drink Vodka!" Thanks, Grafton, for making it a postscript. If it had been in the body of the letter, there wouldn't have been any class news last month. — FRED W. GOLDTHWAIT, *Secretary*, 274 Franklin Street, Boston, Mass. SIDNEY T. STRICKLAND, *Assistant Secretary*, 75 State Street, Boston, Mass.

1907

Under date of March 22, John Frank wrote us the following thoughtful and interesting letter: "Had an interesting experience in Phoenix, Ariz., the other day that will give you a little news of two of our classmates who seem a little modest about writing to you. I refer to Benny Carter and Jack Tresnon. Benny, as you may remember, is the president of the Vinson-Carter Electric Company, who are the leading electrical contractors in Phoenix and appear to have a very fine and well-established business. Ben, as you doubtless know, has been there in Phoenix a great many years. Incidentally, I was pleased to find that his company occasionally sells Ilg fans in Phoenix. Jack Tresnon is chief dispatcher for the Salt River Valley Water Users Association, which means that he has charge of the electrical distribution of all of the power manufactured in the Salt River Valley — a most important job in connection with the water and electrical situation in that part of the world.

"The three of us had a very pleasant luncheon at the Westward Ho House, Phoenix' famous hotel, and naturally reminisced about everybody in the Class that we could remember, right straight through from F. O. Adams to A. Zuest. Sam Coupal is operating a mine not far from Phoenix. We had hoped that we could get him in so that our huddle could have been quadrangular, but Sam was unable to make it. Jack and Benny are both in fine shape and are living, in my opinion, in one of the most interesting and attractive spots in the United States. They both promised to be good 1907 men from now on and write to you regularly."

John said that he had been in touch with Joseph M. Baker, who is living at 6355 South Laflin Street, Chicago, and that Joe had promised to meet him for lunch. The letter then concluded: "I believe you have information on all the other 1907 men in town. It so happens that most of them are architects including Rebori, Fred Schmidt, Earle Reed, and Sam Marx. The best-known 1907 man in

Plan to attend Alumni Day at M.I.T. on June 6

1907 Continued

town is, of course, Jim Barker, Vice-President of Sears, Roebuck. You of course know all about him, because he is a member of the M.I.T. Corporation. I see Jim occasionally — the last time at a luncheon for the Tech Alumni Fund Drive, at which he and Bouscaren '04 were hosts."

We want to thank John publicly for his cooperation, having thanked him personally by a letter long ago. If only more '07 men would follow his example! It must be true that members of the Class often learn of facts relative to other '07 men, which would make most pleasant news for our records and for The Review notes.

When in Providence, R.I., on March 28 we called on Howard R. Chase at his office at 50 Borden Street, where he serves The James H. Tower Iron Works as chief engineer and sales engineer. Aside from six months with the American Bridge Company at New York immediately after graduation, Howard has been with the Tower Company ever since 1907. The firm does structural and ornamental steel and iron work and also manufactures tanks; in fact, the firm is in a position to furnish practically every kind of steel equipment except machinery. Although it has been 30 years since Howard and I have met, we recognized each other at once. He looked fine, just as immaculate in his appearance as he always was when an undergraduate. He has a son, Howard, Junior, who is married and is connected with Starkweather and Shepley, Inc., general agents for The Travelers Insurance Company in Providence; also a married daughter, Barbara, who lives in Providence.

A perusal of the 1937 edition of "Who's Who in Engineering" disclosed the inclusion of the names of the following '07 men within its covers: Henry B. Alvord, Head of the Civil Engineering Department at Northeastern University, Boston; John G. Barry, mining and geological engineer, engaged in private consulting practice, Mills Building, El Paso, Texas; E. Leon Chaffee, Professor of Physics at Harvard University; Allan R. Cullimore, President of Newark (N.J.) College of Engineering. Allan was an assistant in civil engineering at M.I.T. from 1907 to 1909, and then after two years as assistant engineer for the city of St. Louis, became dean of engineering at the College of Industrial Science of the University of Toledo. In 1916 he became dean of engineering at Delaware College, from which position he went to the deanship of Newark College of Engineering in 1919, and in 1927 became president. He is married but has no children.

Continuing the "Who's Who" list: John A. Davis, chief engineer, Information Division, United States Bureau of Mines, Washington, D.C.; John M. Frank, President, Ilg Electric Ventilating Company, Chicago, Ill.; James E. Garratt, designing engineer, Division of Water, Department of Public Affairs, Newark, N.J.; James M. Gaylord, chief electrical engineer, Metropolitan Water District of Southern California, 306 West

3d Street, Los Angeles, Calif.; Stuart C. Godfrey, lieutenant colonel, United States Army, Office of Chief of Engineers, War Department, Washington, D.C.; Lawrence C. Hampton, engineer for Union Oil Company, Los Angeles, Calif.; Hudson B. Hastings, Professor of Industrial Administration at Yale University; Ralph G. Hudson, Professor of Electrical Engineering at Technology; Edwin W. James, chief of division of highway transport, Bureau of Public Roads, Washington, D.C.; Henry D. Loring, Vice-President of the Ferro Concrete Construction Company, Cincinnati, Ohio; Edward L. Moreland, senior partner in Jackson and Moreland, consulting engineers, Boston, and Head of the Department of Electrical Engineering at Technology; W. Watters Pagon, consulting engineer, 1308 Lexington Building, Baltimore, Md.; James Reed, general manager, Golden Gate Bridge and Highway District, San Francisco, Calif.; Thomas W. Roby, valuation engineer, Seaboard Air Line Railway Company, Norfolk, Va.; Willis G. Waldo, 506 Mills Building, Washington, D.C. Willis has had wide experience, having been inspector for Detroit River Tunnel Company, an irrigation engineer, instructor in Vanderbilt University, engineer and secretary of Tennessee River Improvement Association from 1916 to 1930, president of Southern Industries and Utilities, Inc., from 1928 to 1935 when the dam project was sold to the Tennessee Valley Authority, and now he is president of Blue Ridge Corporation of Maryland, of Nuevitas Bay Company, and chairman of the committee on finance and extension, School of Engineering, Vanderbilt University. Leslie C. Whittemore, engineer of design, the Sanitary District of Chicago, Ill., is another '07 man in "Who's Who in Engineering."

In closing, we bring this thought to you '07 men who read these words: Write to your Secretary a message regarding your own doings or those of some classmate whom you know about. A pleasant and profitable summer to you all! — BRYANT NICHOLS, *Secretary*, 126 Charles Street, Auburndale, Mass. HAROLD S. WILSON, *Assistant Secretary*, Commonwealth Shoe and Leather Company, Whitman, Mass.

1909

Our honorary member, Charles T. Main '76, is deeply appreciative of the attention shown to him on a trip to Bermuda in April. At the pier in Hoboken he was met by Paul Wiswall, who sent him off with a hearty "*Bon Voyage*." In Bermuda he was greeted one day by Chet Dawes who, with Mrs. Dawes and their daughter, was also on a cruise to that enchanting spot. A call was made at Kenneth Trimmingham's store in Hamilton, but unfortunately Kenneth was out at the time, so we are unable to have a firsthand report about him. The Trimminghams (Kenneth and his brother) have one of the finest stores on the island, and I am sure would be glad to welcome any Tech men who happen to be visiting Bermuda.

Incidentally, Kenneth has quite a reputation as a sailor, his six-meter boat *Solenta* winning the second race, sailed on April 21, for the Prince of Wales Trophy, putting him in third place, to date, with respect to the total points for the series.

The premarital examination bill, passed by overwhelming majorities in both houses of the New York State Legislature, was sponsored by Tom Desmond in the Senate. — One of the 138 junior ushers selected for the Smith College Commencement this year is Janet Spencer, daughter of Mr. and Mrs. Henry K. Spencer of Winchester, Mass. The appointment is an honor made in recognition of a student's contribution to the life of the college. The girls will carry the ivy chain at Ivy Day exercises on June 18 and will usher at indoor exercises on Ivy Day, at commencement, and at the president's reception.

Paul Wiswall's comments on being an honorary secretary of M.I.T. are so human that I have taken the liberty of quoting them verbatim: "I am coming to the conclusion that the simplest way to get back in touch with the Institute and also to renew your youth is to get yourself appointed an honorary secretary. You may loathe such a moniker as much as I do, but if there is still some sap in your veins, you'll get a great deal of fun and also downright satisfaction in being a local representative of Technology. The time taken is infinitesimal. You can always terminate an interview. But you see boys who want to go to Cambridge, some well fixed and some as poor as I was, some with excellent family backgrounds and some without. Your sympathies may be rather deeply touched by the answer to the invariable question: 'Why do you want to go to Tech?' If you try to do your job for Tech in anything like the way you work on your own job, you are writing to Bat Thresher '20 to give him your slant on the interviewees and giving him a tip on your impression of the boys as potential recipients of help with their expenses. You know when anyone connected with admissions is in your neighborhood. You can hear at firsthand what is going on in Cambridge.

"I have had two prize interviews already and I have never had the least regret about the time I have spent with any of those who have come to me. The first of my prize calls was from a pretty, pink-cheeked, diffident girl who wanted to become a civil engineer. Later I went to see her and her family. I soon learned that they were in very tough circumstances. Yet they told me that they were satisfied that Tech was the best technical school in the country and they wanted their Gladys to go there. I hope I succeeded in advising against her going. The other was a call at the home of an orthopedic surgeon who was trained in his native Vienna under the famous Dr. Lorenz. If we can get boys like Peter to fill the ranks of the freshman class, we need never have any qualms about the type of men the Institute will be turning out." — CHARLES R. MAIN, *Secretary*, 201 Devonshire Street, Boston, Mass.

1909 Continued

Assistant Secretaries: PAUL M. WISWALL, MAURICE R. SCHARFF, New York; GEORGE E. WALLIS, Chicago.

1910

Mr. and Mrs. Robert Luthers Sherwin have announced the marriage of their daughter, Roberta Mae, to Robert Ellis Burnett, on Saturday, February 26, at Newark, N.J. This is of interest because R. E. Burnett is the son of Robert F. Burnett. — John Barnard held an exhibition of his water colors at the New Gallery on Dartmouth Street, Boston, from April 5 to April 18. The exhibition was very interesting. John's paintings are of various subjects and are done with a sparkle of color which is most pleasing. — The following is taken from the Boston *Herald* of April 4: "John M. Bierer, an executive of the Boston Woven Hose & Rubber Company, left to attend the Rubber Technical Congress to be held in London next month under the auspices of the rubber industries." — Samson K. Cohen, who is a designing engineer at Stone and Webster, has a son who is a lieutenant in the United States Marine Corps, now stationed with the Pacific fleet.

The Class Secretary had the pleasure of a call from two charming young ladies recently. They are the daughters of our classmate Louis O. French. One is studying for a doctor's degree at Brown University and the other was visiting her sister. — The March issue of the South Dakota *Highway Magazine* has several articles by H. E. Beebe of Ipswich, S.D. The following is an excerpt from that issue: "H. E. Beebe of Ipswich, secretary of the U. S. No. 12 Association, has been a crank on the elimination of unsightly highway signs for years. Quite a bit of the land near Ipswich along the Yellowstone Trail, which happens to belong to people who have placed their land in the hands of Mr. Beebe for rental, is entirely devoid of any signs whatsoever. Mr. Beebe's idea is that if there are to be signs along the highway, the logical place is to have them a short distance from each of the centers of population where the tourists can buy the goods that are advertised on the signs and that these signs be grouped together in a 'sign park,' and be very good-looking and attractive." — HERBERT S. CLEVERDON, Secretary, 46 Cornhill, Boston, Mass.

1911

During the last four weeks of the current phase of the Alumni Fund, 18 classmates answered the appeal of Alma Mammy, bringing our class total up to \$5,410 from 81 members, or 21.4 per cent of the Class. Chicago was the active leader in this last spurt with a quartet of contributors, honors, curiously enough, being divided equally between mechanicals and electricals, with Armand Peycke and John Wilds of Course II and Jim Duffy and Ed Woodward of Course VI. From mid-Illinois came a subscription from Hal Babbitt, XI, of the faculty of the University of Illinois. Next honors in this report go to the metropolitan area,

where Dick Gould, XI, of the Big Town and Bill Orchard, XI, and Jim Johnson, II, of Newark responded. Johnson, by the way, had been among the "no address" group, but we learned a while ago that he is teaching at the Essex County Vocational School in Newark. Upper New York State had one lone response, coming from G. Arthur Brown, X, who is in Vestal, outside Rochester. Maryland had two: Ban Hill, I, in Baltimore and Francis Cooke, XIII, in Silver Spring. Carl Schafer, another "naval ark," subscribed from Camden, N.J., as did Pete Gaillard, VI, from Washington. From Michigan the lone response came from Staf Francis, IV, who is practicing architecture in Plymouth, while from the Pine Tree State a generous pledge came from George Estes, II, of Auburn. Metropolitan Boston lagged in the home stretch, although as reported last month it held up well in the earlier stages of the campaign. Two of our chemical engineers, Thorne Wheeler of Arthur D. Little, Inc., and C. R. Johnson, saved the Hub from a shutout in the final four weeks. And so we rest in our fund-raising efforts for the nonce, awaiting better business conditions.

Remember Mollie MacPherson, that fine young lady who accompanied Roy and Ina up to Douglas Hill for our 20-year reunion in 1931? Well, sir, on April 22 in Grace Congregational Church, Framingham, Mass., Mary Elizabeth MacPherson became Mrs. John Augustus Crane. Best wishes for a very fine future, Mollie and John!

Up to this point, classmates, you have read about 300 words but — you ain't heard nuthin' yet! Gather close, concentrate, read: "Mrs. William Gibson Borland of Beverly Farms and New York announces the engagement of her daughter, Miss Rosamond Borland, to Peter Desmond White of New York. Miss Borland's mother is the former Miss Lucy Sturgis Codman and her father was the late William Gibson Borland of New York. She is a sister of Mrs. Thomas Perkins Brooks of Concord and John Nelson Borland of New York. She attended Miss Chaplin's School and studied music in Paris. Lately she has been living in New York. Mr. White is the son of the late Mrs. Edward V. Douglass of New York and the late Peter White of Dublin, Ireland. He is the brother of Mrs. Francis Holbrook of Des Moines, Ia., Mrs. George Palen Snow, Thomas J. and Victor G. White of New York, and James M. White of Kansas City. He is a member of the Rockaway Hunting Club and is associated with Babcock and Wilcox." — That, boys and girls, appeared in the esteemed Boston *Evening Transcript* on March 30 and not in Bob Ripley's column. It's true, and our bachelor idol is about to become a benedict. May your tribe increase, Pete, and all your troubles be little ones!

Jim Greenan, III, we learn from good old Charlie Locke '96, has returned for a vacation to his home in Carmel, Calif., via the air clipper from Manila, after spending about a year on examination work in the Netherland East Indies and

British Malaya for Marsman and Company of Manila. — From the Alumni Office we learn that Phil Caldwell, III, has moved from Groton, Conn., to 416 Fowler Avenue, Pelham Manor, N.Y., and Lester Cushman, IV, former "Royal Chef" of Tech Show fame, has left Medford and is now located at 1009 East Boulevard, Charlotte, N.C. — While making my annual pilgrimage to the Boston Hotel Show just after mid-April, I met and talked with Roger Loud, VI, and his wife and younger son. Roger and Esther said their older boy had just had an appendectomy but was getting along splendidly. As usual, Roger was in charge of the Edison display of electric cooking units on the stage of the Statler ballroom. — See you at Alumni Day, Monday, June 6, I hope. Remember this marks the passing of old Rogers Building, whose steps and portals hold such fond memories for us. — ORVILLE B. DENISON, Secretary, Chamber of Commerce, Worcester, Mass. JOHN A. HERLIHY, Assistant Secretary, 588 Riverside Avenue, Medford, Mass.

1913

Twenty-two men gathered at the University Club in Boston on Saturday evening, April 2, and their enthusiasm augurs well for our 25th reunion this month. Larry Hart was with us and gave us an idea of the kind of speech he will make, on behalf of the 25-year Class, to this year's graduating Class. Larry is a very busy man, with Johns-Manville, and his work as sales manager of their building materials division takes him all over this country. It was almost 25 years since I had seen Gardner Alden, X, manager of the research division of the Dennison Manufacturing Company, Framingham, Mass.; Leo Hartnett, IV, heating and ventilating engineer, department of Boston school buildings; George Richter, X, whose work is chemical development for the Brown Company, Berlin, N.H., paper manufacturers; Louis Walsh, X, renegade (Louis' term) engineer, bank examiner for Reconstruction Finance Corporation; and E. H. Cameron, I, partner, Arthur L. Nelson Engineers, Boston, power plant and industrial engineers. Pa Ready delivered the bon mot of the evening. Bill Mattson was bemoaning the lack of class spirit, particularly among a large number of our mates who used to be full of fire in extracurricular affairs in the period 1909 to 1913. At this point up spoke Pa: "Tell 'em to wake up for three days in June; then they can go back to sleep for another 25 years."

Early returns from Bill Mattson's first letter to the Class are very encouraging for a large attendance at the reunion. Bill had 25 acceptances in the first 40 replies. J. M. Cadenas is coming from Havana, Cuba.

Among Bill's replies we had the sad news, from his sister, of the passing of Caleb C. Peirce, IV, who had been in poor health for nearly four years. — FREDERICK D. MURDOCK, Secretary, Murdock Webbing Company, Box 784, Pawtucket, R.I.

Plan to attend Alumni Day at M.I.T. on June 6

1914

A class author at last! And the honors go to the only coed to be with us on graduation day, Marion Rice (now Mrs. Ray Hart). The book, recently advertised in the New York *Times* under the caption of "We guarantee a laugh or a chuckle on every page," is entitled, "Who Called That Lady a Skipper?" It is recommended for the yachtsman and for the girl who gets seasick in a canoe. Congratulations, Marion! We are more proud of you than ever.

One expects an officer in the military or marine service to move about a bit, but it is genuinely refreshing to have one who sends in his new address after every move, and in addition supplies a bit of news with it. Major Burnham is now at the marine barracks at Quantico, Va., but expects a shift from his present assignment of disbursing officer to that of maintenance officer in the office of the post quartermaster. This Quantico assignment is on top of a year in Washington in the Army Industrial College. Burnham also writes that the selection board in January stopped just one number above him, so that he now has to wait until next January to find out whether he is destined to continue as a soldier or to start a chicken farm.

Word has been received of the death of two Technology men who were at some time associated with '14. The first is Chauncey E. Doud, who was with us during the first two years. Doud died on December 19 and had been living in Cleveland. The second is Lawrence L. Travis, who was with us for our last two years, but officially was a member of '15. Travis had made his home in Chicago and died during the past winter.

With the suspension of the Alumni Fund Campaign because of rough business weather, a final letter telling of the situation was sent out to the Class. This letter, as was the case of all letters, was mailed to the entire Class, regardless of whether or not a subscription had already been made. This was done that all might be kept informed as to the progress. On April 20 our score showed \$7,669.48 from 83 subscribers. We hope to reach the 100 mark. — H. B. RICHMOND, *Secretary*, General Radio Company, 30 State Street, Cambridge, Mass. CHARLES P. FISKE, *Assistant Secretary*, 1775 Broadway, New York, N.Y.

1915

Hurry up, hurry up! The recent campaign produced a spurt, so that on April 18, 79 classmates had contributed \$5,865. This is 16.8 per cent of the Class, an average subscription of \$74.50, and an average per capita subscription of \$12.45. This compares very favorably with the all-Alumni totals, but there's still room for improvement; so let your checks roll in. Good news! The class cocktail party definitely will be in rooms reserved for us in the Hotel Statler, Boston, on Monday afternoon, June 6, preceding the all-Alumni dinner. This will be free to all classmates and their guests, and everyone

is urged to come. A notice has been sent you, and the room numbers will be posted in the Statler lobby.

It's nice to know that there are still good men like Howard King, who has sent in the following class notes: "Readers of our (sometimes missing) class notes will be interested to know that C. W. Williams, I, has been appointed assistant commissioner of borough works for the borough of Manhattan. He is working under Walter D. Binger '16, which shows how the younger Classes forge ahead. The Manhattan Borough Works Department boasts of other Technology influence in the person of Lester C. Hammond '02, chief engineer. Mayor LaGuardia has established a reputation for picking men for what they can do on their jobs. This system sounds downright sensible. — I am still engineering for the Mason and Hanger Company — at present on the north tube of the Lincoln Tunnel, where I frequently see A. H. Anderson, who is protecting sundry interests of the Port of New York Authority on the New Jersey side." Congratulations from the Class to Cy Williams for this responsible job.

In the *Journal of Industrial and Engineering Chemistry*, March 10, Vernon T. Stewart, X, had a write-up under the heading of "Father and Sons in Chemistry." Stewart is head of the Chemical Engineering Department at the Newark, N.J., College of Engineering. His son Richard M. Stewart was graduated from Technology in 1932. He has been with Anaconda Wire and Cable Company in New York and recently was registered as a patent attorney, where he has been handling business on all types of insulators and copper. It looks as though young Stewart is really the first class baby at the Institute. Remember Herb Swift's movies and "Help Azel" with notes. — AZEL W. MACK, *Secretary*, 40 St. Paul Street, Brookline, Mass.

1916

On April 6 Frank Ross of Hartford, Conn., lost out on the quarterly final match for the Pinehurst, N.C., golf championship when he was beaten by George T. Dunlap, Jr., of Pinehurst, former tournament champion, by a score of 2-1. — Tom Holden, who is vice-president of the F. W. Dodge Corporation and president of the New York Building Congress, broke into print again on Wednesday, March 2, when he addressed the Chicago Real Estate Board with an analysis of future building prospects. One or two of his remarks may be of interest to the readers of this column: "Two things happened last year to check for a time the healthy but moderate construction revival that was taking place. First, buyers went on strike; it usually takes only a few months to correct such a condition sufficiently for recovery to be resumed. The other factor in the decline was the planned tapering off of public works." Later on he said: "The almost hysterical alarm that greeted last year's mild recession of private construction activity was, to my mind, out of all

proportion to the realities of the situation. The truth of the matter is that a mythical bubble burst; a mirage was dissipated which had been made up of false expectations of a speculative housing boom."

Jack Freeman is now living on Porter Hill at Middlebury, Conn. He recently moved to this location and is not only getting settled in his new home but is also planning a landscape and farming project. Jack is located just west of Waterbury, not far from the New York-to-Hartford highway, via Waterbury. This information is for classmates who may be heading for New England this summer by automobile.

At last we have some information from Cy Guething. He writes me from the Book-Cadillac in Michigan. His work as assistant sales manager of the Heald Machine Company of Worcester, Mass., keeps him traveling about the whole United States continuously. He speaks of having visited with Kem Dean at Houston recently. His boy was graduated from Exeter in 1937 and is now in the Class of '41 at M.I.T. The boy seems to be taking after his father. He is six feet, three inches tall, weighs 175 pounds, and wears size 12 shoes. This looks like a record for the Class. Can anyone compete with this? Cy's boy is on the class crew and squash teams, and is a member of Chi Phi Fraternity. Cy promises to be with us for our 25th reunion in 1941. It is not too early to be planning for this event. — JAMES A. BURBANK, *Secretary*, The Travelers Insurance Company, Hartford, Conn. STEVEN R. BERKE, *Associate Secretary*, Coleman Brothers Corporation, 245 State Street, Boston, Mass.

1917

I am not sure but that the able assistance Professor Hulburd gives will not serve to make these notes rather more than less difficult for the other half of the secretariat. Two months have slipped by, and there seems less than the usual amount of material, and Phil has set almost too high a standard. Fortunately, a few classmates, at least, are considered newsworthy, and clippings about them are available from time to time. There is, for example, the *Times* story about Edgar Gorrell's appearance before the senate committee as president of the Air Transport Association. Colonel Gorrell urged the passage of a bill amending one to establish a Federal aviation authority and noted that the establishment of a long-time national policy would assist the industry in financing.

Also in print appeared Robert C. Erb, who lent color to the spring flower show in Mechanics Building in Boston on March 21. In full uniform as aide to Governor Murphy of New Hampshire and tastefully surrounded by the governor's family and Mrs. Erb, Bob's photograph decorated the Boston *Herald* on the following day. — Another officer, Major Walter L. Medding, now for some time stationed at the Armory across the street from the Institute, hopes soon to be transferred to the Mississippi Basin, where

1917 Continued

there will be opportunity to give more emphasis to engineering phases of army equipment. — Announcement of the promotion of Edwin F. Barry to his majority appeared recently in the army directory. Major Barry is now stationed with the Ordnance Department at Watertown Arsenal, Watertown, Mass. — Major Simpson R. Stribling is stationed at Ordnance Department Headquarters, Schofield Barracks, Hawaii.

By the tradition of journalism, it is news when a man bites a dog. Similarly, it is news when an individual changes his affiliation from 1917 to 1918. William Doye Neuberg of Oradell, N.J., has given no explanation for his action. — RAYMOND STEVENS, *Secretary*, 30 Charles River Road, Cambridge, Mass. PHILIP E. HULBURD, *Assistant Secretary*, Phillips Exeter Academy, Exeter, N.H.

1918

When last we had a portrait of Wendell P. Monroe — done in whispers — he was assistant engineer of the Illinois Central Railroad. Now comes a shout from William C. Furer '06, Secretary of the Engineering Association of Hawaii, who incloses a copy of the *Weekly Bulletin* which reflects in no uncertain terms an outstanding engineering accomplishment. As to Wendell, Mr. Furer says: "Mr. Monroe (together with Mrs. Monroe) had been in Hawaii nearly a month before we discovered him. In fact, it wasn't until the last week of his stay that we found out that he was a graduate of M.I.T. It was then too late to get the M.I.T. crowd together for a luncheon meeting, but we did persuade him to talk at the Engineering Association's meeting on Friday noon, March 18 — only a few days before his departure for the coast. Are all 1918 men this modest?"

"Monroe's work as consultant for the California State Highway Commission and his design of a traction layout for the San Francisco-Oakland Bridge is, no doubt, a real piece of electrical engineering. He tells about it with becoming modesty. He may be somewhat short on stature but very long in gray matter. . . . — And just that you may be sure Monroe really has suffered the dreadful sting of talent, we quote again from the *Weekly Bulletin*: 'The dictionary says that 'to cut the Gordian knot is to remove a difficulty by bold and energetic measures.' But the intricate knot which the hard-boiled king of Phrygia tied into the thong of his chariot was a simple affair compared with the one which the Key and S. P. systems were trying to tie into the San Francisco-Oakland Bridge. Nonchalantly, Alexander the Great, with his sword, made short work of the problem bequeathed him by King Gordius, but Wendell P. Monroe, consulting electrical engineer, in this here 20th Century faced a tougher job put up to him by the California State Highway Commission. The latter owns the bridge and supposedly everything fixed thereto. It was up to the commission to provide a solution for a serious problem on which the two traction companies hadn't been able to agree.

The Southern Pacific operates its electrical suburban system on 1,200-volt direct current while the Key uses 600 volts. Both use overhead trolleys.

"Mr. Monroe of New York, a recognized expert on electrical traction problems, has been spending a brief but well-earned vacation in Hawaii after having worked out complete plans and specifications for the operation of the two systems over the bridge. He told us about it at last week's meeting, March 18. The plans include not only the electrical operating facilities on the bridge itself, but also the big terminal building at the San Francisco end, switching yards at the Oakland end, and three substations. The total outlay will be in the vicinity of \$17,000,000. The 'bold and energetic measure' which forms the basis of Mr. Monroe's way of cutting the Gordian knot was to provide a third rail carrying 600 volts which the Key System uses (dropping a shoe down to the rail as the cars come onto the bridge) and an overhead catenary, carrying 1,200 volts, which is used by the S.P. Alexander used his sword and a strong right arm; Wendell Monroe used a slide rule and a keen head."

But there are other members of 1918 who are awake and stirring betimes — or maybe it is the essential incandescence of burning the well-known midnight oil that produces portraits done in shouts that ring through exasperated air: A new method of operating blast furnaces is expected to have important effect on the cost of iron and steel, according to a paper delivered before the American Institute of Mining and Metallurgical Engineers. Julian M. Avery of the research laboratories of Arthur D. Little, Inc., Cambridge, inventor of the new process, stated that the use of higher pressures on pig-iron blast furnaces would reduce the ore to pig iron and slag without great losses now occurring.

"The problem of 'solution losses' has been understood for years and some steps taken to reduce it, but previously no fundamental answer has been proposed," said Julian. "A modern blast furnace may be 100 feet high and 30 feet in diameter. It costs millions of dollars and has a daily capacity of hundreds of tons of pig iron. If costs are to be kept low, the amount of iron produced must be kept high. Coke is expensive, and as little as possible should be used, but if the furnace produces its maximum tonnage of iron, too much coke is consumed; if, on the other hand, as little coke as possible is used, it is now necessary to decrease production, and the fixed charges on the enormous investment eat up the coke saving."

Balancing the fuel value of the top gases produced against cost of coke consumed and fixed charges, Avery showed that pressure operation should ultimately result in savings on the order of one to two dollars per ton of pig iron. Since pig iron production in the United States averages about 35,000,000 tons a year, the indicated saving to industry amounts to tens of millions of dollars a year. He added that the new process will permit

the steel industry to use, in normal times, only its most efficient furnaces and to hold less efficient furnaces as stand-by equipment, to a much greater degree than is now possible.

The March 15 *Mining Journal* carried a heart-warming appreciation of one of the classmates, written by Gordon Wilson, and here reproduced in full: "Richard Sturtevant Everit, geologist and mining engineer, died suddenly at Groton, Massachusetts, on January 22. Everit was born at Framingham, Massachusetts, in June, 1897, and received his degrees from Harvard and Massachusetts Institute of Technology. Immediately after graduation in 1918 he enlisted in the Coast Artillery where he served for the duration of the war.

"In 1919, Everit's first mining experiences took him into such fields of operation as: Pilares de Nacozari, Sonora, Mexico; Mina Tecolotes, Santa Barbara, Chihuahua, Mexico; an irrigation project at Las Cruces, Texas; and the Ray Consolidated Copper Company, Ray, Arizona. In 1921 he became an assistant geologist to Cia. Minera Real del Monte at Pachuca, Hidalgo, Mexico, where he had charge of a party engaged in making a thorough geological survey of that section.

"I first met Everit early in 1925 when he became my mine superintendent at San Vicente Mining Company, San Vicente, Sinaloa, Mexico. In 1927, on taking over the management of Cia. Minera y Beneficiadora de Inde at Inde, Durango, Mexico, I was again fortunate in obtaining his services, and, during a drastic turnover of employees, called on him to take charge — in turn — of mine, mill, and general office and accounting. As a result of his unusual abilities he kept these departments operating smoothly until a new staff could be secured. Those of us who have operated more or less isolated camps with limited foreign personnel during the still unsettled post-revolutionary times in Mexico can fully appreciate the deep comfort and satisfaction derived from the knowledge that one has at one's side, not only staunch unswerving loyalty combined with high efficiency and cool level-headed fearlessness in an assistant, but a friend, besides.

"With the severe curtailment of all mining operations — particularly in silver producing Mexico — Everit turned his attention to mica mining in Connecticut, endeavoring to revive that industry by grouping under one management several individual properties and applying more scientific methods of operation. In this he obtained marked improvement over previous operations. In 1937 he took over the management of the U. S. Mica Company's properties at Rockymount, Virginia, but poor health forced him to give this up last fall. I can pay no more sincere tribute to this young man's memory than to state that, since our very first association, his sterling qualities and character, his high integrity, and unusual ability so impressed me that I have endeavored to have him with me in every undertaking with which I have since been connected."

Plan to attend Alumni Day at M.I.T. on June 6

By the time you receive this, most of the preparations for our 20th reunion at Weekapaug Inn, Weekapaug, R.I., on June 24, 25, and 26 will be complete. Shorty Carr will have the banquet arranged, even to the treachery of doilies that care little for static equilibrium. Tom Kelly will be ready to turn the frail and hapless businessman into a brisk golfer, impatient swimmer, or bush league baseball player. Our Gretchen will flutter effectively where fluttering will do the most good. Maggie Magoun, vainly cultivating a ferocious scowl, will still be trying to solicit your letter and \$2.00 for the new issue of the "Eighteenth Amendment." For all we know, there may be arrangements for so advantageous a disparagement as a troubadour singing "Love Wakes Anew This Throbbing Heart." Anyway, now that we have passed off all our studies, and a thoughtful faculty has long since covered our intellectual nakedness with a diploma, let there be a fandango in the streets, the ringing of bells, and the apathy of the man replaced by the enthusiasm of the boy as we gather together for three days of renewed fellowship. — F. ALEXANDER MAGOUN, *Secretary*, Room 5-117, M.I.T., Cambridge, Mass. GRETCHEN A. PALMER, *Assistant Secretary*, The Thomas School, The Wilson Road, Rowayton, Conn.

1919

We received a very interesting letter from Edward Adams Richardson, who is living in Bethlehem, Pa. Ed entered the Army in August, 1918, reporting to Camp Humphrey, Va., a couple months later for officers' engineering school. Two months later, after 35 days in the hospital with flu, he was discharged. Ralph Cartwright helped him get into the Hartford Fire Insurance Company, with which he was connected in Chicago and Kansas City. In August, 1922, Ed started with the Curtiss Aeroplane and Motor Company at Garden City, Long Island, N.Y., and worked on methods of weight control, which are still used by the industry. While with this company Ed also learned to fly (16½ hours, 5½ hours solo) and qualified for structural analysis work, spending one year at two other local airplane factories.

In January, 1925, Ed went with the Bethlehem Steel in Bethlehem for work with the special engineer, getting out a technical handbook on a wide variety of technical problems. He was granted patents on a method of preparing fuels for injection engines, on a new metering and injection valve, and a new method of utilizing permeable bodies for heat insulation; others on high-temperature chemical processes (covering nitrogen fixation), and on low heat storage refractory furnaces are well under way. Ed also criticized Einstein before the American Physical Society and the Optical Society of America, February, 1929, offering an alternate theory. For the last two years, Ed's spare time has been spent writing a book on business cycles and recovery, which is still in manuscript form. Ed is still single, sees Ralph Cartwright occa-

sionally, and hopes to take in the 20th reunion. — That's a swell letter, Ed! If all the members of the Class were like you, what a cinch this secretarial job would be — but they are not.

Under the excellent leadership of George McCreery, the drive for the new gymnasium resulted in a flood of subscriptions from around Boston. Other principal parts of the country also came through well, so that a high percentage of the Class is certain to be on the subscription list. If you are one of the few that remain and have not sent in your contribution, please send it in, however small, in order that the Class will go down in record as pulling its share of weight in the boat. — How about a little more news from some of you hermits? Overcome that innate modesty and send us the facts of life. If I am not mistaken, I made a serious oversight in omitting the announcement of the birth of Susan Rhodes Blake to Marion and Art Blake on December 6. I know you will forgive me, Art, when I tell you that my own daughter, Sylvia, born July 11, did not appear in print either. What a Secretary! — ARKLY S. RICHARDS, *Secretary*, 26 Parker Street, Newton Center, Mass.

1921

Rice, roses, and reunions are the order of the day. Under the last heading comes Alumni Day which is observed this year on Monday, June 6, and which affords that yearly opportunity to reduce the hypothetical "Take Me Back to Tech" to its literal terms. New buildings and new dormitories will receive attention in Cambridge, and the farewell to Rogers will sever the last tie to the old appellation of "Boston Tech," so assiduously shunned by younger generations of reporters for *The Tech*. The annual banquet will climax the day's activities. Though 17 years of servitude admit us to the bald-headed row, our esteemed five-year contemporary will still observe plentiful evidence of what it took to organize impromptu nocturnal military maneuvers, stilling Boston traffic with roseate beacons expropriated from Harvard Bridge's annual face-lifting operation!

Bill Sherry of Tulsa, Okla., has added to his laurels as honorary secretary by leading his district to victory in the Alumni Fund Drive Regional Contest. Members of the clan in Oklahoma will now properly celebrate "With a Stein on the Table," filled with Bill Rose's "P.O.N." Sam Moreton of Brookhaven, Miss., is also on the list of trophy stein winners for the noteworthy increase in the per capita subscription of the Mississippi district during the contest.

Ralph Wetsten distinguished himself as an able speaker and a superb organizer with a demonstration and entertainment via the Hammond electric organ at the fourth annual banquet of the M.I.T. Club of Northern New Jersey. Ralph is highway illumination engineer for the Public Service Electric and Gas Company and is responsible for the splendid new lighting of New Jersey highways. His hobby is music and his home in Summit,

N.J., is a mecca for lovers of the king of instruments. Others of the Class at the banquet included Max Burckett, Pip Coffin, Sumner Hayward, Fred Kowarsky, and Cac Clarke, who was named president of the Club for the coming year. Added to last month's list of 1921 men active in alumni affairs are Bill Loesch, Vice-President, and Seymour Colton, executive committee, M.I.T. Association of Cleveland.

Address revisions received during the month include: Thomas B. Card, VI, Box 205, Providence, R.I.; Frederick J. Curtin, I, 2403 East 72d Street, Chicago, Ill.; T. Dillwyn Dutton, VI, 416 Seventh Avenue, Pittsburgh, Pa.; Harold N. Ewertz, XIII, 141 Levering Mill Road, Cynwyd, Pa.; Russell C. Johnson, III, American Smelting and Refining Company, Apartado 3-Bis, Chihuahua, Mexico; Francisco L. Lazo, I, 3 Calle Tacuba No. 16, Mexico D.F., Mexico; Raymond E. Patten, II, R.F.D., Norwalk, Conn.; Max B. Pearlstein, I, 48 Clarkwood Street, Boston, Mass.; Edward W. Sherman, Jr., V, Box 334, Apponaug, R.I.; Arthur L. Silver, XV, 615 East Mitchell Avenue, Cincinnati, Ohio; Marshall H. Winchester, II, 15 Kellogg Street, Windsor, Conn.

See you at Cambridge on June 6. Look for the gang at luncheon and prepare to bare your life's history for your Secretaries! — RAYMOND A. ST. LAURENT, *Secretary*, Rogers Paper Manufacturing Company, Manchester, Conn. CAROLE A. CLARKE, *Assistant Secretary*, 10 University Avenue, Chatham, N.J.

1922

No news is said to be good news but more good news from the widely separated Class would be a godsend to your Secretary as the last minute for getting out these notes arrives. Fred Burt paid us a most welcome visit from Chicago. It was a bright spot in an otherwise cloudy world to have Fred say that the coin-registering devices over which he has charge for the Johnson Fare Box Company are now being sold at the highest rate in the company's history.

The following members of '22 attended the recent annual banquet meeting of the M.I.T. Club of Northern New Jersey: Ray Burrus, President of the Technology Club of South Florida, who came all the way from Coral Gables; Milt Manshel, Fullerton Webster, Richard Downing, A. P. Munning, Bill Grady, Tom Gill, Ev Vilett, Jack Teeter, and Yours Truly.

The March 26 issue of the Worcester Evening Gazette contained a striking picture of three professors of Worcester Tech sailing toy sailboats around the gymnasium pool by man-made wind from their own lusty lungs. Ken Merriam's craft seemed to be leading the race at the "Kids' Party" for seniors, which evidently goes to show that the teaching profession makes for an abundance of lung power and a remarkable freedom from care and worry.

Larry Coddling, assistant secretary in the Jersey district, has developed and carried through the fine idea of sending out a questionnaire to members of the

Class in his territory. Many returns have come in which we will endeavor to use from time to time. We wish some of the other Secretaries would follow suit. Larry himself has entered the general insurance business with Smyth, Sanford and Gerard in New York City, having severed his connection with Public Service of New Jersey. Larry has been attending law school nights and will have been graduated by the time this issue of *The Review* goes to press. He expects to use the law to the advantage of his insurance business rather than to set up in law practice.

Fullerton Webster, VI, lives in Moun-
tain Lakes, N.J., and is transmitter engineer in the radio transmitter development department of the Federal Telegraph Company, Inc., in Newark. He is married and has two boys, one 10 and one three years. — Chester Greening, II, lives in Leonia, N.J., and is production engineer for the Aluminum Company of America at Edgewater. Chet is married and has one child, other than which he says his proudest accomplishment is to have one leg on the Al Bowers ping pong trophy. — Joseph Baker, X, lives with his wife and one child in Arlington, N.J., and is the responsible head of the chemical department of E. R. Squibb and Sons.

The Montana newspapers on March 5 carried obituary notices and eloquent editorial comments on the death of Joseph A. Thaler, head of the engineering school of Montana State College. Professor Thaler had served the institution for over 30 years and was 73 when he died. He was graduated from the University of Minnesota and from Purdue, and in his later life went to Technology with our Class, although he was not graduated with us. — Once again, lest you forget: Send in the news. — CLAYTON D. GROVER, *Secretary*, Whitehead Metal Products Company of New York, Inc., 303 West 10th Street, New York, N.Y. C. YARDLEY CHITTICK, *Assistant Secretary*, 77 Franklin Street, Boston, Mass.

1923

This will be an opportunity to thank those who responded to my appeal for class dues in April. These remittances have helped put ahead the reunion plans which, when these notes appear, will be about complete. We're counting on seeing you at Old Saybrook, the Riversea Inn, Friday afternoon, June 3, through Sunday, June 5. And then for Alumni Day at Cambridge, the following Monday, June 6! There's still time to get there, and preliminary responses are so good we think there'll be the biggest crowd ever. Bob Shaw induced Pete Pennypacker to assume the chairmanship of the gathering. Bob, in New York, and Howard Russell, in Boston, are heading two of the major round-up committees. Others on the reunion committee, in addition to the above and the class officers, are Jim Brackett, John Burchard, Clarence Chaisson, Fred Mann, Walt Marder, and Bernie Proctor. That's the roster as the notes are written. There'll undoubtedly be others turning to, to help before we get through. If you

aren't one of those active on part of the arrangements, all you've got to do is come, to complete your share of the party.

Ragnar D. Naess became vice-president of Tri-Continental Corporation, New York, last December. He had been with Goldman Sachs and Company for seven years. He explains his work vaguely as "working on the general economic situation," and is about as vague as any of the rest of us would be in trying to explain what the general economic situation at present may be.

C. Russell Ellis reports that he has returned to private engineering practice, after about three years modestly contributing to new deal P.W.A. and T.V.A. activities. In connection with the latter, he speaks highly of the opportunity it gave him to explore considerable areas of the beautiful Great Smoky Mountains National Park. — Bill Lutz and Jack Keck were elected vice-presidents of the M.I.T. Club of Northern New Jersey at its April meeting. — HORATIO L. BOND, *Secretary*, 18 Jefferson Road, South Braintree, Mass. JAMES A. PENNYPACKER, *Assistant Secretary*, 96 Monroe Road, Quincy, Mass.

1924

Among weddings reported in the New York Times recently was that of Andrew P. Kellogg and Miss Carolyn Callanan at Schenectady, N.Y., where Andy is an engineer with the General Electric Company and his bride the president of the Union Publishing Company, publishers of the Schenectady *Union-Star*. Andy is an officer of the United States Eastern Amateur Ski Association and a member of the Mohawk Club of Schenectady. — From Pennsylvania papers we learn that Tom Rhea has recently been granted a patent on a control system by the United States Patent Office and has assigned the patent to the General Electric Company, for whom he works in Pittsburgh. — George Tapley has been transferred, we hear, from the United States Engineer Office at Tucumcari, N.M., where he was in charge of the design of Conchas Dam, to the office of the Chief of Engineers, United States Army, Washington, D.C.

A letter which did our heart good arrived recently from Forrest B. Royal, commanding officer of the U.S.S. *Porter*, stationed at San Diego, and written while at sea for a fleet problem. With his letter came a check for the Alumni Fund, sent to do its part toward the class total, despite the fact that Commander Royal spent only one year at the Institute as a graduate student. — From the Newark *Evening News* we learn that Leon Colman has been promoted to the job of superintendent of the Newark shops of Public Service Coordinated Transport, after having served the company since graduation. — FRANCIS A. BARRETT, *General Secretary*, 50 Oliver Street, Boston, Mass.

1925

Circumstances have necessitated my resigning as class secretary, and the resignation has already been accepted by

President Tom Price. However, a new Secretary has not as yet been appointed, and pending such appointment I shall endeavor to put together what few items have trickled in during the past month.

A letter from Lloyd Irving, II, informs me that his activities can hardly be classed as news. He leaves news making to Hitler, Mussolini, and F.D.R. Lloyd is taking care of business for the Goodyear Tire and Rubber Company in upstate New York. He resides in Watertown, N.Y., and, as he puts it, takes care of his wife and two daughters as a side line. With that introduction he proceeds to give me a combination safety and advertising talk on the merits of the Goodyear tires. It leaves me in somewhat of a quandary, for Toni Lauria, also Course II, says just the same things about Sears, Roebuck tires, which he dispenses from the Sears Super-Service Station in Boston.

If you will refer to Technology Men in Action in your May Review, you will find an item regarding Y. H. Ku, VI, who has resigned his deanship of engineering at Tsing Hua University in China to become vice-minister of education. — A telephone conversation with Archer M. Nickerson, Jr., II, a few days ago confirmed the fact that he is still at the Fore River plant of the Bethlehem Shipbuilding Corporation in Quincy, Mass. His position there is design and production engineer. From Roland T. Seabury, XV, I find that he is still with the concern of Seabury and Cushman, dealers in shoe goods in Boston.

A much belated notice of the death of Austin W. Maddocks, XV, on September 12, 1930, was brought to my attention within the last few weeks. Maddocks was residing in Waterville, Maine, at the time of his death. — Two men for whom we have had no addresses for several years have been located recently. Alan G. Benedict, XIII, is residing in South Windsor, Conn., while Garland P. Peed, Jr., VI, is reported from Pacific Palisades, Calif.

The Register of Former Students provides the information that several of the Class are moving about considerably. Harry Newman, V, has forsaken Salem, Mass., for Newark, N.J. Webster Garst, IX-B, has also left the Bay State and taken up residence at Bradenton, Fla. Milton G. Salzman, IX-B, has returned East after several months in Spokane, Wash., and is now located at Lynbrook, Long Island, N.Y. Herbert R. Pierce, I, who has been in Washington, D.C., has gone to Circuta, Colombia, with the South American Gulf Oil Company. — F. LEROY FOSTER, *General Secretary*, Room 6-202, M.I.T., Cambridge, Mass. HOLLIS F. WARE, *Assistant Secretary*, 17 Green Road, Medford, Mass.

1926

This, then, is an alibi. In fact, alibis seem to be quite popular. They furnish excuses either for those who do things in the wrong way or those who fail to do them at all. The good old alibi route is taken by far too many. Now for instance, if somebody outside of 1926 were to read this bit of indeterminate literary flotsam,

Plan to attend Alumni Day at M.I.T. on June 6

1926 Continued

he might say to himself: "I don't know just what that Class Secretary is trying to write about, but he most certainly failed to say much in his first four sentences. Maybe the poor guy was sick."

Those of 1926 who may stumble across this chaos in the news will say: "I guess that Killian had not recovered from his appendectomy when they let him have a fountain pen to play with." And if the discussion warmed up, it might even be suggested that the Secretary had engaged an alibi writer to develop an agenda about the happenings of the Class. Whatever the facts, it is generally known by this time that the Secretary is now completely recovered and that either he or somebody in his behalf managed to uncover the following items in time to make the class notes dead line for this issue.

Charles G. Hutzler of New Haven, Conn., and Miss Elizabeth Piddington of New York City were married on January 22 in New York's famed "Little Church Around the Corner." For them the Class trusts that they will find the prosperity that was for several years supposed to be lurking in that vicinity. To complete the record of this particular nuptial we add that George A. Fogg was best man. (Naturally only a '26 man could qualify for that title.)

And here is one for Ripley: Allen L. Cobb is now a resident of Irondequoit, N.Y. Like the famous Detroit-surrounded town of Hamtramck, Irondequoit is totally submerged by the city of Rochester. For fear that the mailman might not be able to penetrate the lines, Cobb reports that his business address continues to be the Eastman Kodak Company, Kodak Park, Rochester, N.Y. And now that the veil of secrecy is off, we may as well go the full distance and state that he is assistant general director of safety and fire prevention for all the Eastman branches, stores, and associated companies in the United States and Canada.

Sad news indeed was transmitted to the Secretary in a letter from Willard E. Vaughan, who reported the sudden death, on December 27, of Lawrence B. Gregory. While Gregory was not with the Class during our entire four years, he entered with 1926, later transferring to Boston College and then returning to the Institute, where he received an S.M. in 1929. Our informant, Vaughan, has been in the development department at the Sun Oil Company in Marcus Hook, Pa., for the past five years.

The April issue of the *Canadian Mining and Metallurgical Bulletin* had this to say regarding one of 1926's doctors: "For the most outstanding paper submitted during 1937 on applied or economic geology, Dr. H. C. Gunning, of the Geological Survey, Ottawa, was awarded the *Barlow Memorial Prize* of the Institute [Canadian Institute of Mining and Metallurgy]. His paper, entitled *Cadillac-Malartic Area, Quebec*, was presented at the annual general meeting in Montreal last year and summarizes three years of work in that area, the results of which afford a striking example of the value of geological guidance in prospecting.

"Born in Belfast, Ireland, in 1901, Dr. Gunning received his preliminary education in the public schools of Vancouver. He is a graduate of the University of British Columbia, and . . . was accorded the degree of Ph.D. by the Massachusetts Institute of Technology. Since joining the Geological Survey in January, 1928, he has been engaged chiefly in the mapping of areas in British Columbia and in northwestern Quebec. His report on the *Zeballos River Area, Vancouver Island*, issued several years ago, was largely instrumental in attracting widespread attention to the possibilities of this now active area. He is perhaps best known in mining circles, however, for his work in the Cadillac-Malartic area, a part of which involved the determination of the eastward extension of the mineralized belt of greenstones. . . ." — J. RHYNE KILLIAN, JR., *General Secretary*, Room 11-203, M.I.T., Cambridge, Mass.

1927

In these days of billion-dollar deficits and fireside chats on the state of the nation, your Secretary feels that it may be appropriate to enlighten fellow classmates on the state of the treasury department. The Class is still solvent. We had a slight surplus before plans for our 10th reunion got under way last year. This was used for sales promotion, but we are happy to report that due to the able management of Bill Taggart as general manager and Joe Burley as treasurer and the other committee members who unselfishly gave their time and energy to the cause, the original cash was replaced, together with a few dollars profit on operations.

You will recall that in order to make a gift of \$25,000 to the Institute in 1952, several members of the Class took out \$1,000 life insurance policies, the dividends from which for the first 15 years were to be set aside in a separate fund and presented to the Institute on the occasion of our 25th reunion. You will also recall that in case of the death of any of the assured prior to the expiration of this 15-year period, \$100 of the death claims are also applied to this fund. Originally 268 policies were issued. A great many of the fellows have found it necessary to take the dividends on their policies instead of allowing them to go to the Institute. This was done with the permission of Technology. Nine policies matured as death claims, and on April 1 dividends on 171 policies were paid to the Institute. The total cash accumulated to date amounts to \$12,526.59, indicating that the class endowment will be considerably in excess of the \$25,000 originally planned, as there are still 14 years in which funds will accumulate at interest. The funds will nearly double in that time, and in addition the Institute will receive four more dividends from contracts. The Class can be justly proud of this record.

We cannot, however, take such pride in our record of contributions to the fund for the new gymnasium, as only 17 per cent of the Class have sent in contributions. The per capita contribution is \$5.58. All those who have not yet con-

tributed are urged to do so now as we are behind both the Class of 1926 and the Class of 1928; that, of course, will never do. Incidentally, Alf Berle was on the general committee for organizing the class drives in this section, and Ray Leonard was in charge of the 1927 solicitors in the Boston district. Both of these men put in a lot of work, so let's give them a hand.

Joe Burley has been seen recently tripping back and forth to Washington, D.C. He claims he has been making business trips for the Boston Insulated Wire and Cable Company, working with the Bureau of Standards on specifications and special wires used in connection with the aircraft industry. Personally we think this is just a blind and that Joe's real reason must be that he has political aspirations. His head is beginning to look more like Jim Farley's every day; so perhaps he feels that that qualification may make him eligible to get in line at the pork barrel.

We hear that Bob Bigelow has been blessed with the birth of a daughter recently — his first child. Bob, as you know, has been working in the experimental department of the United Shoe Machinery Corporation for the past several years and is now engaged in program committee work. — Alf Berle says he is not a relative of Adolf, so lays no claim to fame on that score. Alf has attained fame in other lines, however. For about four years he was with the Investors Foundation in New York City and was coauthor of a book, "Inventions and Their Management," which was published by the International Textbook Company of Scranton, Pa. Incidentally, this book is well worth while, and anyone who has anything to do with new products and patents can get a great deal of helpful information through its study. For six months during 1936, Alf was on the staff of Maurice Holland '16, director of the National Research Council. His duties were to plan technical study tours for utilities executives for the Third World Power Conference. In the latter part of 1936 he was brought to Boston to work with the experimental department of the United Shoe Machinery Corporation. His duties include patent studies and the coordination of the patent and experimental departments. Alf is one of the many who have been bitten by the ski bug and is known to have worked out at Tuckerman's Ravine as late as April 19.

Dike Arnold is still making gadgets — particularly atomizers and sprayers for use with glass cleaners, toilet waters, germicides, fly sprays, and so on (*adv.*). The Arnolds recently visited the Jim Lyles's at their new home in Bronxville, N.Y., and returned with glowing reports of Jim's family and home. Jim supervised the planning and building of the house himself (or perhaps Molly did it) and it is perfect, even down to the smallest detail. — Judas Priest is New England district manager of the Mason Neilan Regulator Company and is the proud daddy of a year-old, red-headed, husky little lad known only as Butch. Judas has been

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pinched so many times for motor law infractions (of course it's always because the cop is just ornery and never because Judas does anything wrong) that he now pays yearly dues to an organization which guarantees to "fix" everything. — Willard R. Tougas is with the Union Central Life Insurance Company and also conducts an insurance brokerage business of his own. Tougie, too, is proud of his three-year-old son, not without cause.

Don Wylie, now living in New York, apparently found real inspiration in his pursuit of knowledge at the Institute, for after graduation he went to the Harvard Business School for a two-year course. Not satisfied with the degrees of two colleges, Don took up the study of law at the New York University Law School and, in 1936, was graduated with the degree of doctor of jurisprudence. The above information was incidental to the announcement carried by the April 3 issue of the Boston *Herald* which told of the marriage on April 2 of Miss Hilda Wood Lynde of Andover, Mass., and Donald Penniman Wylie of New York.

Jim Lyles writes as follows: "Having been threatened with physical and mental violence by our redoubtable Class Secretary, Ray Hibbert, if I did not produce some news for the forthcoming issue of *The Review*, I am herewith attempting to make a slight contribution. My business wanderings during the past year have not taken me so far afield as during previous years, and it therefore happens that I have not run into many of our classmates during recent months. Some time ago I ran into Ernie Dodge on the train. He is still working in the long-lines department of the American Telephone and Telegraph in New York, and I gathered that he is presently engaged in the installation and operation of new types of high-speed telephone equipment. I believe that he was married not long ago and is now living in Fleetwood, N.Y.

"I spent an evening with Warren Smith in Pittsburgh last week. He is with the Koppers Company, as he has been for a number of years, and has charge, I believe, of the systems department, which is apparently devoted to improving methods of accounting, particularly involving simplification of consolidating the financial statements for the many companies included in the Koppers group. He showed me his workshop, a room full of automatic machines leased from International Business Machines Corporation, which can produce a balance sheet in the twinkling of an eye and apparently can produce a surplus or deficit with equal facility — all you have to do is rearrange some of the wires. Smith has been having a field day with this sort of work for some time, and it has resulted in a very substantial simplification of the work. His spare time seems to be devoted at present to the development of a six and a half acre piece of land he acquired some 15 miles outside of Pittsburgh. He and his good wife spent the evening showing me the various sights of Pittsburgh, most of which I found could be observed . . . from various and sundry barrooms.

"Morgan Collins is now with Lehman Brothers, investment bankers in New York, where he is an expert on the securities of industrial companies. He has been with Lehman, I believe, about two or three years and previously was with Glore, Forgan in Chicago. — Just in case Dike Arnold, the efficient Assistant Secretary, does not happen to mention it, I spent a very pleasant evening with him and his good wife at their new home in West Newton. He has just completed the house, and it is quite an establishment. A number of the rooms are already filled with children, and while I heard no reports about more being on the way, there certainly will be room for them if they show up. Not the least attractive is the poolroom in the cellar. I am considering suggesting that the chairman of the 15th-reunion committee make Dike an offer for the use of his place for the reunion. Speaking of Dike, his firm has recently introduced a new Sleeping Beauty hair curler which those members of the Class who feel so inclined may obtain from Woolworth's at five cents each. According to reports they are very satisfactory, but I have not yet gotten around to trying them. . . .

"Bob Wallace, who some years ago was with the Stutz Motor Car Company, has more recently been with the Marmon-Herrington Company in Indianapolis, where he is assistant chief engineer. This company is engaged in the production of automotive specialties which include the manufacture of light, high-speed tanks and the conversion of standard makes of trucks from two-wheel to four-wheel drive for the Army, the manufacture of large, heavy-duty trucks for special purposes, such as public line construction, and so on. Bob is married and has two children, a daughter about six years and a son about seven months old. — About a month ago I learned that Ed True, who is with the Hobart Manufacturing Company in New York, was seriously laid up with the flu. I have not heard anything more recently and hope that no news is good news.

"The forementioned seem to be about all of the members of our Class whom I have run into recently or heard about, other than the group around Boston. I occasionally see a number of other Tech men of different Classes, including, of course, Dad Wenzell '17, Dunc Linsley '22, Powell Robinson '23, George Leness '26, Horace Ford '31, all of whom are also with The First Boston Corporation. I have seen Brig Allen '29 on occasion. He is in the real estate business in New Rochelle. — As for myself, I am still in the investment banking business where I landed when I first left Tech. The ups and downs of this business have been numerous, but I have managed to hang on with the group who constituted the nucleus of the corporation buying department of Harris, Forbes and Company back in the predepression days. When Harris, Forbes was sold to the Chase Bank interests, we went with Chase Harris Forbes Corporation, and when that was liquidated in 1934, we joined

with The First Boston Corporation. I think that at almost all stages of the game, the buying end of the companies with which I have been connected has contained a majority of Tech men. Strangely enough I do not know of any other members of our Class, except Collins and myself, who are in this particular end of the business.

"For whatever interest it may be, the result of the drive for the Alumni Fund for our Class in New York was pretty much of a failure. Less than half a dozen out of about 100 made any contribution. Undoubtedly business conditions and the uncertain outlook were primarily responsible, although very few of those who did not contribute answered the inquiries. Just a word more for the record. I thought that the 10th reunion was a grand success and a much more satisfactory occasion than the fifth. In this I think that most of those who were present will agree. The credit goes to the committee, and in view of the trend, I feel sure that the 15th reunion, four years from now, will be something to look forward to with anticipation and real pleasure. After all, 1942 will be two years after 1940." — RAYMOND F. HIBBERT, *General Secretary*, Care of Johns-Manville Corporation, Waukegan, Ill. DWIGHT C. ARNOLD, *Assistant Secretary*, Arnold-Copeland Company, Inc., 222 Summer Street, Boston, Mass.

1928

The response to our first reunion announcement has been swell — much better than to the first publicity for our fifth reunion, and we thought that was good. What a get-together our 10th is going to be! Wow! Remember, "a 10th reunion comes only once in your lifetime. Don't miss it!"

Ye Castle Inn looks better than its description in recent letters. In them we glowingly told you about it and mentioned how it used to be a private mansion, how it stands out at the end of Cornfield Point about a mile from the mainland, how it was one of those millionaires' "watering spots" you read about in novels. Well, Gang, we were too modest. Our committee has been down again and looked at it under better light and we've seen it in the spring — instead of late winter. Boy, if you miss this treat, it's your own fault; 'cause this spot has got everything and more!

No, sir, "you ain't seen nothing yet," if you haven't been to Saybrook. Be sure to bring your swimming suit, tennis racquet, golf clubs, and tennis shoes. We're planning everything else. There'll be poker fests, oldtime bull sessions, a class banquet with movies, and tennis, golf, horseshoes, and swimming for those who want them; a single men versus married men ball game if there are enough singles left — otherwise, a game between the bald heads and the thatched heads; and, of course, a huge clam bake (with lobsters) on the beach Saturday noon.

It's a week-end you just can't miss; we repeat: Your 10th reunion comes once and this is the year. Ye Castle Inn on Cornfield Point, Saybrook, Conn., is the

Plan to attend Alumni Day at M.I.T. on June 6

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place, June 3, 5 P.M., to June 5, 5 P.M., the time. The three-day price is the Class of 1928's answer to the alleged "Roosevelt Recession" — just \$19.28. A large gang of us is arriving Friday night, but we'll take care of you whenever you come; with a \$14.03 charge if you arrive Saturday morning, and \$12.28 price for Saturday afternoon arrivals.

This is the last publicity in The Review, so please act at once. We've got over twice as many "I'm going's" as we had for our fifth, but before you drop this magazine, say to yourself, "I know those boys on the committee would appreciate a letter from me with a deposit. So here's mine now!" Please mail your letter saying you are coming (along with a deposit) today! Send from \$1.00 up to full price with your reply, and address it to Robert Harris, Reunion Chairman, Room 3-402, M.I.T. All checks should be made out to William J. Kirk, Treasurer.

Mr. and Mrs. Oscar Alexander Walker, Jr., have recently announced the engagement of their daughter, Elsie Gene, to Charles Topping at Galveston, Texas. — Jim Cullen has four children varying from five years down to five months — a two boy-two girl combination. — Lou O'Malley has been in Montana on business and, by the way, gang, the travels of this skinny *hombre* since June, 1928, would make quite a story.

On April 6, Hal Porter, I, became a blushing papa to a son, John Hardy Porter — a recruit for the Class of 1960. Our congratulations, Hal! — Your Secretary is also proud to report the birth of a daughter, Susan Morse Chatfield, on April 22. In view of this fact and the forthcoming 10th reunion, the father is doing as well as can be expected.

Don't forget to reserve your reunion berth with Bob Harris, our Chairman. The dates — June 3, 4, and 5 at Saybrook, Conn., between New Haven and New London. See you there! — GEORGE I. CHATFIELD, *General Secretary*, 5 Alben Street, Winchester, Mass.

1933

Quinquennial reunion; June 4 and 5; Norwich Inn, Norwich, Conn.; \$10! You have just about time to throw a toothbrush into your pocket and get on your horse. Everyone is going to be there, and you're a brown bagger if you don't come. There is not much point in putting news into The Review because we are all going to get it firsthand at reunion. However, there may be a few legitimate excuses for not being there, so here is what we have for this month: From the society columns we have the announcement of the engagement of John Davis Williams to Miss Beatrice Eaton Beckwith, who planned their wedding for late spring and will live in Wilmington, Del.

Joe Wetherell walked into my office during April; he is a salesman for the Niagara Alkali Company on Long Island. Joe looks as though he has taken off a little weight, but other than that he is fine. — Had a letter from Walt Duncan recently; he is now director and vice-

president of Bornot, Inc., in Philadelphia. This is the largest cleaning and dyeing establishment in the United States and the second largest in the world. Walt went with this company in 1936, leaving his pleasant work with Procter and Gamble. He says he is enjoying his work tremendously.

Received a letter during April from Steve Crick, who is down in Washington, D.C., with the American Automobile Association, in their auto racing division. At the time, Steve was looking for someone living in the New York Metropolitan area who is interested in automobile racing. I am sure he would be glad to hear from anyone who reads this and is interested. That is all now, and I'll be looking for you in a few days. — GEORGE HENNING, JR., *General Secretary*, Belmont Smelting and Refining Works, Inc., 330 Belmont Avenue, Brooklyn, N.Y. ROBERT M. KIMBALL, *Assistant Secretary*, Room 3-102, M.I.T., Cambridge, Mass.

1934

Well, here it is the June issue of The Review, with the whole summer ahead in which all sorts of things are going to happen. So you men keep your pencils sharp because I'll be expecting lots of interesting news by the time the first fall issue comes due. By the way, does it make any of you feel a little bit homesick for the Institute when June rolls around, making plans on how you are going to spend your summer vacation? In comparison with a couple of weeks out of the working year, three months with nothing to do but swim and fish or follow the trade winds up the coast seems more or less like blissful infinity. Well, it is a happy thought — the kind that plagues you about this time of year, but one that should not be dwelt upon too much.

A letter from our old scribbler, Bill Ball, seems to indicate that the Ethyl Gasoline Corporation is keeping him on the jump. About the middle of April he and Lois moved to Pittsburgh, where he has been put in charge of the automotive section of the Pittsburgh clinic. I guess this makes him an automotive engineer despite the fact that he was graduated from Course XV. He will be in Pittsburgh until July 1, Erie until August 1, Jamestown until September 1, Buffalo until November 15, Rochester, Syracuse, and so on. He says all he needs to be a perfect nomad is a camel. Principally, his job is to give an hour and a half lecture four or five times a week on fuels, engines, and motor tune up. There is also a certain amount of contact work to be done during the daytime. Well, Bill, it looks as if you will have your chance to see the world without joining the Navy.

Bill says he has run into a few of our classmates around New York and gives accounts of them. John McLean, who has been instructing at Technology, is now working for the Tidewater research labs. He is doing research on gasoline composition at the Bayonne, N.J., laboratory. George Priggen is now salesman for the Socony-Vacuum Oil Company, Inc., and is in charge of about 30 leased stations

on Staten Island. Jack Dunning is an assistant teller at the Park Avenue and 52d Street branch of the Corn Exchange Bank Trust Company.

Another letter from Stanley Bebler gives a very good account of what has become of a number of the Course XIII men. Stanley is working for the Bethlehem Shipbuilding Corporation in Quincy, Mass. His job in the order department of the hull drawing room is ordering material and routing work through the yard. Last September Mrs. Bebler presented Stan with twins, one a boy and the other a girl. I'd say that called for a double set of congratulations. As far as I know they are the first twins from our Class. Charlie Wright is also working in the drawing room, doing structural work on the new destroyers. He is still single. Bill Baker is in the scientific department. He's married and living near Boston. Tom Donlan is working in the yard, handling the structural work on the new aircraft carrier U.S.S. *Wasp*. Tom is still single, but apparently may not stay that way long. Ed Fleming is in the scientific department and has been working on the flight-deck calculations for the *Wasp*. He and Mrs. Fleming have just completed remodeling a home in South Weymouth. Don MacNaught, also in scientific, is busy remodeling a very old colonial house in Hingham. He is the proud father of a 10 months' old son. Dan Strohmeier, whom we last mentioned on top of Mount Washington, is holding down some sort of an executive job. But there seems to be a mystery concerning just what he does. Come clean, Danny. What is it?

Walter Wrigley, VIII, is back at the Institute for graduate work in aviation instrument design. Reports say that he is still single. — A letter from Leo Carten informs us that he has been transferred from the Aberdeen Proving Grounds, Maryland, to Washington, D.C. He is an ordnance engineer in the War Department. He says he ran into Joe Daleda, who is working in the Patent Office daytimes and studying law at night. Bill Dobbins is putting in his second year of teaching at Robert College in Istanbul, Turkey. Beshara Battit is filling various engineering assignments for Jackson and Moreland in Boston. Roger Coffey is development engineer for the Aircraft and Engine Development Corporation.

We have a few engagement and wedding announcements that will be of interest. Bob C. Becker has finally got around to marrying Grace. It happened on March 5 down in Guayaquil, Ecuador. Now they are back in camp again and settled in their own home. On March 13 Rene DuBois was married to Miss June Huss, daughter of Mr. and Mrs. J. Westley Huss of Urbana, Ill. Jack Platt has got himself engaged to Miss Evelyn Doctor, daughter of Mr. and Mrs. Philip Doctor of Dorchester. Maurice Marshall is also planning to take the final step with Miss Marion Donohue, daughter of Mr. and Mrs. Robert M. Donohue of Brookline.

At this time I want to make the announcement of the appointment of Herbert W. Andrews as secretary of Course

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X. He will write the notes concerning the activities of the men in this Course, and these will be published periodically under a separate heading. Will the members of Course X kindly direct their correspondence in care of Andrews at the DeFlorez Engineering Company, 19 Rector Street, New York City. Announcement of other Course Secretaries will be made at a later date. We are hoping by appointing several Course Secretaries to keep you men in close contact with what your old pals in your Courses are doing and thereby give the class notes a more intimate and interesting touch.

Now you fellows have a whole summer ahead of you in which to write what you have been doing and drop me a line on your friends in the Class. There are probably dozens of you who have had a pen poised on the verge of writing and then have decided to go to a movie or out to get a glass of beer instead. Well, next time you have that pen poised, exert the necessary will power and write that letter first. We want the November issue of *The Review* to have all the news of the summer while it is news. — JOHN G. CALLAN, JR., *General Secretary*, 24 Quincy Street, Cambridge, Mass. ROBERT C. BECKER, *Assistant Secretary*, South American Development Company, Apartado 655, Guayaquil, Ecuador, S.A.

1935

Here is your last reminder for Alumni Day. We will get together at the University Club at 5:30 before going to the Alumni Dinner, June 6. Be sure to be there to shovel up some of the good old bull with the boys. — We have only two cupid announcements from the papers this time. Guess we really are getting to the saturation point. Dick Hall and Helen Farrelly are engaged. Dick was with us for the first two years and is now working for the Katadyn Process Corporation in New York City. Jack Colby and Priscilla Allen have announced their engagement. Jack is a sales engineer for Johnson Service Company of Boston, according to my records. Professor Locke '96 sent me a note stating that Bob Clarke has recently become a happy father — no details available.

The following are a few miscellaneous items I have picked up. Neil Beaton, who was a graduate student in our Class, is now with the Northern Canada Mining Corporation, Ltd., in Toronto. — Jim Long, another of the grad students, is now a professor at the United States Naval Academy postgraduate school. — Jim Notman has joined the B. F. Sturtevant Company in their St. Louis, Mo., sales office. Sturtevant makes industrial fans, power-plant equipment, and heating, ventilating, and air-conditioning equipment. — John Teasdale is now working for the Metallizing Engineering Company in Worcester, Mass. — Hal Everett is residing at 164 Mortimer Avenue, Rutherford, N. J. He is employed by the Foxboro Instrument Company in New York City. Barclay Bloomgarden has turned farmer on us. He now has his own farm with about 30 cattle, five horses,

miscellaneous pigs, chickens, a dog, and a wife (last but not least). The farm is about 150 acres in size, I understand. Barc spent a year at Fort DuPont under the Thomason Act before taking up farming. — Nix Dangel was with the United States Public Health Service after graduation. He then spent a year at Fort DuPont under the Thomason Act and since early 1937 has been at Harvard Medical School. At Harvard he is a research assistant, investigating virus problems in the department of communicable diseases.

Bud Pflanz wrote me a letter from "Somewhere in Oklahoma (the natives call it Bartlesville)." Bud says that he has been working for the same company since last October, but that its name has changed twice, the latest one being Electric Advisors, Inc. (formerly Cities Service Company). Says Bud: "Are you fellows trying to keep your identity hidden from T.V.A. *et al.*?" Bud has been in the valuation department, working on oil pipe lines, gas pipe lines, and electric utilities of the Cities Service Company, and has been skipping about the southwestern part of the country, more or less like a bumblebee flitting from one flower to another. He complains about the fact that Oklahoma is a dry state and so is Kansas, which is 20 miles away from Bartlesville. Bud also mentioned that Frank Lovering is in Oklahoma and is now married. We'd like to have the details, Frank. Bud asks that some of you fellows write to him at his mail address, care of F. C. Hamilton, 60 Wall Tower, New York City.

George Glaskaws sent in the only other letter of the month. Here is George's contribution: "On March 13, largely through the efforts of Al Fletcher, a group of Course II'ers collected at his abode in Canton, Mass. In this group were Dave Dale, Dick Cook, Tom Charnley, George Forsburg, and myself. Ham Dow was supposed to have been in this gathering but illness on his wife's part prevented his appearance. (Secretary's note: Mrs. Dow has since recovered, we are glad to hear.)

"We remained at Fletcher's long enough to pile into one car, and then off to Cranston, R.I., we started. Here, after a little difficulty with speed laws, traffic violations, and so on, we arrived to find Jeff Farmer awaiting us. Incidentally while I am still on the subject of speed laws, if at any time you receive a ticket down here in the vicinity of Providence, just see Jeff. It took Jeff exactly two and a half minutes to fix up my ticket. I understand he is a personal friend of the mayor or the governor or someone.

"Farmer is looking fine. Unquestionably married life is agreeing with him — so much so, that he heartily recommends it to all the bachelors in the Class. Dave Dale take notice. During the grand bull session that followed in Jeff's apartment, the following items were noted: Dave Dale is located with the Gamewell Company and is devoting his time to the design department. The company deals in fire alarm signals, sprinklers, and so on. Dick Cook is assistant superintendent in a textile mill in Lowell, Mass. He has not

yet given up his studies, for he is now entering his third year at Lowell Textile. Dick has quite a responsible position with a few hundred men under his supervision. Tom Charnley has a title attached to his name over at Lever Brothers, in Cambridge. He is the assistant technical engineer and is getting to be quite an authority on power plants. If Tom does not stop growing, the engineering department at Lever Brothers will have to be redesigned for greater overhead space. George Forsburg also has a title attached to his name — junior marine engineer — and is working for the government on submarine design in Portsmouth, N.H. Al Fletcher is still plugging away at the Bethlehem Shipbuilding plant at Quincy. Now that he has no studies to occupy his attention evenings, Al is constantly spending his time in Everett, Mass. Jeff Farmer is now chief engineer of a textile finishing plant in Providence. He is in charge of all maintenance and technical work. We made a very interesting tour of Jeff's plant. He has done wonders in his first year there and little question remains as to his success in the future."

George Glaskaws, himself, is with Jackson and Moreland, consulting engineers in Boston. His work thus far has been the computation of costs for power and electric bills. He says that the work is interesting and that he is learning the intricacies of peak and energy demands pertaining to power stations. From August to December of last year he was connected with the Titeflex Metal Hose Company in Newark, N.J., where he was assistant to the chief engineer. — That ends the news for this month. I hope to see quite a few of you fellows on Alumni Day. — ROBERT J. GRANBERG, *General Secretary*, McCulloch B-13, Soldiers Field, Boston, Mass. RICHARD LAWRENCE, *Assistant Secretary*, 111 Waban Hill Road North, Chestnut Hill, Mass.

1936

Spring fever must be in the air because the mail returns for this month are slim. However, the Class is still alive, although it speaks little. Here's what it reports: Course II. Warren Eaton, Jr., is working for the Oil Well Supply Company of Midland, Texas. — Another member of our group has crashed into the news by getting engaged. This time it's Fred Prahl, and the girl in the case is Miss Dorothy Markel of New York City. A July wedding is planned.

Course V. Although his New York representative still fails to write him and there consequently is little news about the other members of this group, Bob Sherman has some interesting news about himself: "I have accepted an appointment as a science instructor at Phillips Exeter Academy in Exeter, N.H., starting next September. This means that my work for an advanced degree must be considerably slowed up, but I shall have only a thesis to complete as a requirement, and hope to pass an exam in my major during the coming autumn. As science instructor I shall teach physics and chemistry, working with other instructors,

Plan to attend Alumni Day at M.I.T. on June 6

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who impress me as being tops. I shall have a bachelor apartment in one of the dormitories, but that is not quite what it sounds. As a matter of fact most of the faculty live in dormitories, even married members whose wives and families live there with them. I have already visited the school twice and find the environment fine and the equipment excellent. . . . No news has reached me from Saylor yet, so I assume all is still well. Brent Lowe gets up to Boston about once a month now, so I still see him on occasion, anyhow. Herb Borden has been around here twice lately; second time was for the Walker Assemblies Ball where Brent saw him. I suppose you've already heard (see last month's notes) that Elliott Robinson has definitely been accepted into the graduate school at Harvard, so all looks well for his future." — Bob sends word that Fred Assman has received two raises since he last wrote; he is now in direct charge of the lab of the Ohio Boxboard Company in Rittman. Only about one-third of Fred's work is in the lab, itself, however. He also has various miscellaneous duties such as ordering all colors and chemicals used by the mill, proportioning size emulsion and silicate solution, and routine testing in the plant. And Fred complains that everyone else is doing such interesting work!

Course VI-A. Members of this Course who are affiliated with the Bell Telephone Company receive the spotlight this month. First, there is Luigi Robinett, Jr., who is experimenting for the New York Telephone Company in Easton, Pa. He was married on March 11 to Miss Alice Bodor of Riverdale, N.Y. The bride attended Barnard College. Working for the New Jersey Telephone Company is Frank Phillips. He is engaged to Miss Deborah Beede, a senior at Skidmore.

Course VII. Two members of the public health group have recently changed positions. Ed Knight is now in Big Rapids, Mich., with the Mescota Osceola Health Department. Bill Healy is working for the New Hampshire State Board of Health, headquarters in Rochester, N.H.

Course IX. Just in time to spoil his plans for celebrating last New Year's, Henry Cargen found himself minus his job with J. Stirling Getchell as a result of the depression or recession. It all turned out for the best, however, because he soon found a new job with Pedlar and Ryan, Inc., 250 Park Avenue, at a substantial increase in salary. The work involves planning and writing all publicity and sales promotion for the P. and G., Camay, and Chipso accounts. In addition, he assists the account executives and carries out special assignments. Henry deserves to be well pleased. — From Jim Patterson, II, we have word that Bill Hope was recently very sick with pneumonia, but we're glad to report he's well back on the road to health now. Bill and his recent bride have moved to 329-C Jefferson Avenue, Niagara Falls, N.Y. Bill works for the Moore Research and Service, Inc.

Course X. Orrington Dwyer is now connected with the Sterling Chemistry Laboratory of Yale University.

Course XIII. As promised last month, we are now able to report considerable progress from the Seaboard Navigation Company, with which several of our group are intimately connected. Art Wells reports the activities: "The Seaboard Navigation Company, about which I wrote you last month, is now well under way. In fact, their vessels sailed from South Pier, Commercial Wharf, Boston, on April 25, starting its first voyage to Rockland, Bucksport, and Bangor, Maine. The company recently purchased the *Lexington*, a 522 gross ton Diesel motor coaster, from the Bethlehem Steel Corporation, and Jack Stapler and Alden Anderson spent several weeks at Bethlehem's Baltimore plant, supervising the dry-docking, overhauling, and equipping of the vessel prior to its trip to Boston. The vessel left Baltimore on April 15, and on the following Monday could be seen tied snugly to the Seaboard Navigation Company's pier in Boston. Those of the Class who are around Boston have undoubtedly seen the publicity that was given the company in the Boston papers last week. I am sure I'm speaking for the entire Class when I send 'Best o' Luck' to the Seaboard Navigation Company and our classmates among the officers: President, John Stapler; Vice-President, Alden Anderson; and Treasurer, John Myers. — Last night I attended a very pleasant party given by Frank Mather and Dick Gidley '37, in their apartment at 410 West 24th Street, New York City. By what I call a rather clever idea, they kept the 20 or so lively guests from disturbing the occupants of the apartment below. As each person removed his hat and coat, he or she was requested to remove also his shoes and was presented with a pair of crepe-paper sandals. Frank is working at the Morse plant in Brooklyn, N.Y., and Dick in the Fletcher plant in Hoboken, N.J. Both are being trained for the United Drydock Company's estimating department." An addition to Art's news is the fact that Milton Brooks now works for the Diesel engine division of the American Locomotive Company in New York City.

Course XV. The engagement of Miss Edith Quinlan of Scarsdale, N.Y., to Ed Snow was recently announced. Ed's fiancée is a graduate of Wellesley and Katharine Gibbs. — Ralph Van Sant is now connected with the Hoover Company of North Canton, Ohio. — Win Stiles turns up in Shanghai, China, where he is working for the Texas Company. Details are not available, and I'm curious.

Course XVI. Closing the column in the proper spirit, we report the engagement of Miss Janet Bogue to George Trimble. Miss Bogue was graduated from Sweet Briar College, class of 1937. — ANTON E. HITTL, *General Secretary*, 491 Ashland Avenue, Buffalo, N.Y. ALLEN W. HORTON, Jr., *Assistant Secretary*, Room 3-210, M.I.T., Cambridge, Mass.

1937

This month's notes are being written in the shadow of the Institute, shaking itself of the shackles of winter and an-

other graduating Class, preparing itself for a warm welcome to returning Classes, and watching with totally absorbed interest the progress of the new building arising on Massachusetts Avenue. The design of this new home of the School of Architecture is in full harmony with the rest of the Institute; and, except for the newer appearance of the stonework, this latest super-brain-injector looks like a section from the Great Court moved around to a new place. This is now only late April, so the structure is not the model of completeness it will be later, but already it is grand and imposing. Come up and see it sometime.

The main and only bit of news, outside of letters received, concerns the marriage of Miss Barbara Fowler, daughter of Mr. and Mrs. Fred DuMont Fowler of Newton Center, to Newton H. Hoyt, Jr., on April 9. They are now at home at 1412 Kinyon Street, South Bend, Ind. — Vic Kron has moved from Binghamton back to Boston where, by his latest, he is maintaining a residence at 1171 Boylston Street. He writes that he is " . . . still with International Business Machines Corporation (incidentally that contains six more letters than Massachusetts Institute of Technology — progress?). The address is as above, at least for a while. Am still single and send hearts via New England Telephone and Telegraph rather than Jim Farley, making me some up on Dick Karch. Having lost contact with the outside world and '37 in particular, I fear I don't have much in the way of news — except what I read in the papers — literally. . . . Unless you have some definite checking for me to do about the Institute, I shall assume the role of unofficial Herald society-announcements news hound for the Class. . . . Bye the bye, Westfall's address is 15 Roosevelt Street, North Arlington, N.J. — that's U.S.A. Dick was Course IX. Naturally enough, he still comes back to the Hub of Culture and I hope to cross his trail in the near future. . . ."

Last summer in Cleveland at lunch both Art Zimmerman and the Secretary promised to write often. The first letter went out on November 15, and the second arrived February 15. Art is working with The Weatherhead Company in Cleveland. Referring to our rapid-fire correspondence, he says: "I still have at hand (believe it or not) your note of November 15 and, as you can see, I'm finally getting around to answering it. . . . You have asked me about the other fellows of '37 in Cleveland: Colonel Bob Harris is still with Reliance Electric, is living in a palatial abode on Lake Shore Boulevard in Batenahl, and will be leaving to join their New York office the first of March. Your humble correspondent has been fortunate enough to be able to ally himself with the august group with whom the Colonel resides for the morning meal, so I have the good fortune of breaking bread with our respected classmate nearly every day. I have seen Ralph Chapin several times in the past couple of months. We rode from Buffalo to Cleveland together on the train after New Years, and the week-end before

1937 Continued

last we spent together as the guests of some friends of Ralph and myself in Gates Mills, Ohio. We have also been in church together a couple of times, although we live on opposite sides of town. Such is the call of religion when one has been pushed out upon the cruel, cold world (plus the appeal of a well-read and good-speaking minister's sermons).

"For a word about myself, I will say that due to general economic conditions of which I suppose you have heard a little, I am finding it increasingly difficult to find things to keep me occupied at business more than nine to 11 hours a day. In some way I am glad of this because it furnishes me with an opportunity to do things such as writing this letter to you, and I do enjoy doing them. Even though there is a lessening of the amount of work which I am assigned to do these days, I am still convinced that there is a great deal left to be accomplished in this world, and I certainly feel that we with an engineering background are the logical ones to do it. We are, of course, subject to an economic organization which is dictated by greed and selfishness, and this does give many of us the feeling that we or our services are not wanted. It is for us then to devote our ingenuity to the development of means whereby people may be persuaded that they do want, in fact that they cannot get along without, the services which we have to offer. From this you can see that I do not believe in trying to upset the existing organization and trying to establish rules which may appear to make the road easier now; but rather it seems to me that it is no more than fair that a fellow should prove his mettle by succeeding to a position of authority or prominence by playing the game according to the system as he finds it and then changing the rules if he feels so inclined. . . . I close with every good wish to you and the other members of the Class and with the sincere hope that if any of you are ever in Cleveland, you will not fail to get in touch with me."

Jerry Chapman (14 Clinton Street, Cambridge, Mass.) sent me a letter which makes me feel that perhaps you fellows aren't all living in caves far away from the little green boxes with "Hours of Collection" carefully noted thereon. Jerry, your letter teems with news, so you tell it yourself: "I note with disgust that the news of the Class in general is meager and of X-B, nil. So I thought that I would try to scare some up. To that end, I wrote to all the other eight members of our Practice School group and even enclosed a stamped and addressed envelope. But, as I expected, few answered, th' big bums. However, two did, and I already had old letters from two others."

"So I have a little news to pass on to you . . . : From Al Moore down in Brooklyn, N.Y., at 279 Henry Street, comes a nice long letter. Excerpts follow: 'I have done considerable moving around since I saw you last. The company I am working for, the American Sugar Refinery, has a training course which lasts a whole year. Beginning the sixth of last

July, I worked in the refinery in Philadelphia for about four months. Following that I spent three months in the refinery office in Baltimore learning that end of the business; only last week I was transferred to the New York office on Wall Street, and the schedule calls for me to stay here until the middle of June. At that time I will get two weeks' vacation and then go to work in earnest in one of the refineries. There isn't much telling which of them I will land in, but it will be either Boston, Brooklyn, Baltimore, Philadelphia, or New Orleans. The company gave me ten days off with pay at Christmas, so I felt very lucky. Willard Marcy is also with this company; here in New York now. In fact, he is in this same building in an apartment on the floor below. We both received a slight raise when we came back to New York the other day, so we are feeling pretty good. . . . I haven't heard a thing from any of the other fellows except that Jim Pearce took the flu and a few complications upon arriving home from his tour of Europe last summer. As he had timed his trip to arrive home just in time to enter Harvard Law School, he was unable to attend the first semester."

"All of this information was obtained through George Hunter, VIII, who is now in the Johns Hopkins Medical School in Baltimore. One night I was walking down the street and who should dash up but George; you remember that he went to Europe last summer also. Jim and Ralph Chapin met him while over there, but they didn't travel around with him. It seems that Jim and Ralph got acquainted with a group of college girls who were on one of those conducted tours; they went over on the same boat, and the boys more or less followed them all over Europe. Ralph fell so hard for one of them that he was wanting to marry her, the last I heard. I want the addresses of the other seven fellows in the group, as there are several I should like to correspond with from time to time." — Thanks for the newsy letter, Al. Would that the others would do the same.

"And now we hear what Jim Pearce (248 Woolper Avenue, Cincinnati, Ohio) has to say for himself. Sez Jim: 'Thanks for the letter and stamped envelope — I can take the hint; there are some of the fellows I should like to know about too. . . . Since Commencement I have been moving most of the time. During the summer there was Europe. Ralph Chapin and I did it up brown: We bought a pint-sized English car and drove it some 6,500 miles over Great Britain, France, Germany, Austria, Italy, and Belgium. We did not see all the tourist sights — nothing like that. In fact, we avoided the cities and were in London only a few hours to get visas and some mail. Of course, we visited Venice and Paris and saw some of the Cook Tour spots, but the emphasis was on the Tirol and the Black Forest on the Continent and the Highlands in Scotland. In my case the law school has been postponed for the time being. I may be in Boston next year or I may go elsewhere. I was in Florida when

your letter came but am now back in Cincinnati and finally settling down. I am doing some graduate work at the local university, picking up some of the odds and ends that did not fit into the Course at Tech — some colloidal and an extension of the foreign language situation. One thing I learned this summer is that the year of German as taught at Tech does not enable one to speak German. There were times when Ralph and I were in all sorts of difficulty — as when we tried to get a spring fixed in Germany. My regards to Bob Gunness '34, when you see him, and to George Randall, if you should run into him. — I'd say that Jim had one interesting summer. He didn't mention that bunch of gals, though. Didn't he fall, too?"

"And now I have here a letter, dated September 4, from Ro Ortynsky at 2001 Allston Way, Berkeley, Calif. He says in part: 'I just got a letter from Georgie Randall, a card from Jim, and so I'm getting my Ten-Bee, as you put it, correspondence out of the way. From the postmark you must gather that I'm with Shell Development Company. The place is all right to work in; we work five days a week and only eight hours a day. With me, rooming together at the Y, are Kerry Arabian and Phil Short. So far, the social life around here has been disappointing, as well as the beer situation. . . . Sleepin' Phil wakes up long enough to say 'Hello.' 'Thanks, Ro. Here's hoping that the social situation has cleared up."

"As for myself, I am located here in Boston with Skinner and Sherman, Inc. The firm labels itself 'Chemists and Engineers' and is a swell firm to work for. It is small, and the personnel are all pleasant, helpful, and agreeable. I am in with three other Tech men — H. J. Skinner '99, President; H. L. Sherman '02, Treasurer; and B. G. Philbrick '02, Vice-President. They are consultants, and that makes it an interesting business, as they get diverse problems. It's good experience. Although I'd been there only six weeks, they allowed me two weeks off to go home last summer and I also had Christmas home, thanks to the plane. The firm sent me on an interesting trip to a couple of mills in Ohio, the middle of November, and at that time I also managed to get a couple of days home. And in view of the fact that I was hoping for a position in Boston, I think that I have fared quite well. I met George Randall at Kendall Square one day last summer. He is with E. B. Badger and has been sent to Texas to do his stuff down there. Send in some news, you birds, and let's hear what you're doing."

From Snyder, N.Y. (29 Washington Highway) Ehrler Wagner writes: "Ever since graduating I have been reading The Review and find it all very interesting. It is but a year ago that we used to sit up in 3-440 and hold those lengthy bull sessions about our theses, jobs, and so on. Course II, the Course with four athletic captains — Brittenham, Dodge, Dreisigacker, and Bartholomew — a couple of class officers, and a roost of other '37

Plan to attend Alumni Day at M.I.T. on June 6

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notables, where art thou? But then, this is my first letter. However if I really want to 'talk Tech-ie' there isn't very far to go, since at Worthington Pump and Machinery here in Buffalo we had Engel, Gersen, and Pellmounter. The latter two are working for Carbondale, an affiliate of Worthington but are here in Buffalo to work in the experimental compressor laboratory. Joe Engel and myself were working together as junior engineers as part of a group testing Worthington Diesel and gas engines. Joe, however, accepted an offer out in Kansas with the Atchison Agrol Company. One of his principal duties is to demonstrate the use of Agrol, an alcoholic stimulant for gasoline. Joe planned to drive to Boston with me to attend the Dorm dinner dance, but

his moving out West didn't make it very practical. I drove up anyway and found Tech about the same but growing bigger. About all I saw of the new School of Architecture Building was the skeleton, but even that was impressive.

"I have been experiencing the sensation of working on night shifts and often wonder if many of the other fellows have been doing it. A minister I once knew told me of the young man who was running 100 per cent efficient: 'He'd sleep all day and save his board, work all night and save his lodging.' Although things don't quite pan out as above, I rather enjoy my work even if my income is below five figures. I wonder if many of the Class have been jailed for not paying their income tax? Wilder Moffatt wrote last

fall from Panama, where he is making good in a navy yard. Eugene P. Cooper in his last letter was telling of his experiences out at the University of California at Berkeley, where he has a teaching fellowship in the department of physics. He was still running and did a 10-mile cross-country race over a real Californian mountain, something rare in Cambridge. Gene was also clipping the half off in 1:58. Charles Gadd is at the General Motors research labs in Detroit. He is one of those rare graduates who obtained a job dealing with the subject of his thesis. . . . He ends his letter by saying 'On Saturdays, I sometimes go to the lab to tinker with something.'" — WINTHROP A. JOHNS, *General Secretary*, 114 Beechwood Avenue, Bound Brook, N.J.

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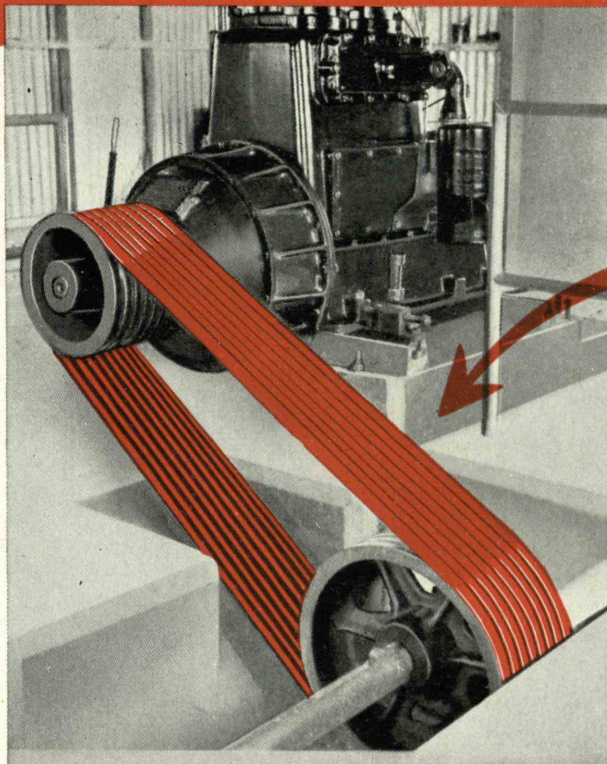
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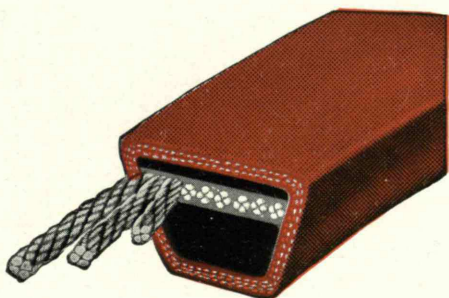
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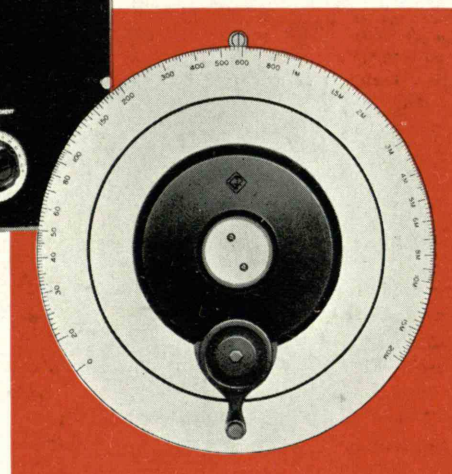
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